



LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

Transport Assessment (TR-001-000)

Part 6: Country assessment

Traffic and transport

November 2013

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Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

A report prepared for High Speed Two (HS2) Limited.

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7 Country Region

7.1 Scheme Description

7.1.1 This section of the TA outlines the regional assessment undertaken for the Proposed Scheme between Colne Valley (CFA7) and Whittington to Handsacre (CFA22) have been assessed and reported by CFA, from south to north along the proposed line of route. At CFA18, the route passes into the West Midlands region, but north of the West Midlands at CFA19 the Country region re-starts. Key features of this area are:

- CFA7 – Colne Valley: above ground alignment entering tunnel at the northern edge of the CFA;
- CFA8 – The Chalfonts and Amersham: in tunnel through the CFA;
- CFA9 – Central Chilterns: part tunnel, part above ground;
- CFA10 – Dunsmore, Wendover and Halton: mostly above ground alignment;
- CFA11 – Stoke Mandeville: above ground alignment, includes Stoke Mandeville bypass;
- CFA12 – Waddesdon and Quainton: above ground alignment;
- CFA13- Calvert, Steeple Claydon, Twyford and Chetwode: Includes Calvert Infrastructure Maintenance Depot (IMD) wth above ground alignment;
- CFA14 – Newton Purcell to Brackley: above ground alignment;
- CFA15 – Greatworth to Lower Boddington: mostly above ground alignment;
- CFA16 – Ladbroke and Southam: mostly above ground alignment;
- CFA17 – Offchurch and Cubbington: above ground alignment;
- CFA18 – Stoneleigh, Kenilworth and Burton Green: mostly above ground alignment leading into the west Midlands region;
- CFA19 – Coleshill Junction: north of Birmingham Interchange station (in the West Midlands region), with above ground alignment and including crossing of the M6 and the M42;
- CFA20 – Curdworth to Middleton: above ground alignment with M42 crossing;
- CFA21 – Drayton Bassett, Hints and Weeford: above ground alignment; and
- CFA22 – Whittington to Handsacre: above ground alignment including connection to WCML.

- 7.1.2 Generally, in tunnelled sections of the route there will be fewer impacts on roads and other rights of way. It is expected that the majority of impacts on local transport networks are as a result of construction of the Proposed Scheme, with the residual operational impacts resulting from the operation of the depot at Calvert (CFA13) and the permanent realignment of roads and PRoW crossing the alignment.
- 7.1.3 The remainder of this sub-section considers the assessment methodology and assumptions specific to this region. Where there are particular assumptions or methodology related to individual CFAs then these are considered within the individual CFA sub-section.

7.2 Regional Methodology & Assumptions

Introduction

- 7.2.2 This chapter describes the methodology and assumptions adopted in the Country section where they differ from those already described in the Route-wide methodology and assumptions chapter or where more detailed information is necessary.
- 7.2.3 Specific issues covered in this sub-section are:
- stakeholder engagement;
 - background traffic growth;
 - modelling framework;
 - public transport assessment; and
 - PRoW assessment.

Stakeholder Engagement

- 7.2.4 A range of stakeholders were consulted during the development of the methodology adopted for the Country assessment including the following strategic and local highway authorities:
- Highways Agency;
 - Buckinghamshire County Council;
 - Hertfordshire County Council;
 - Oxfordshire County Council;
 - Northamptonshire County Council;
 - Warwickshire County Council; and
 - Staffordshire County Council.

- 7.2.5 The methodology proposed was discussed with these authorities and all comments were considered to ensure that the methodology is the most appropriate approach to assessing the impacts of HS2 within the Country section for the TA.
- 7.2.6 London Borough of Hillingdon and TfL were also consulted. However, due to the scale of the Proposed Scheme's impact in the London region, HS2 Ltd's consultants responsible for London assessments provided the primary interface.
- 7.2.7 Accordingly, the transport model in support of the London Metropolitan Area Transport Assessment has been adopted to assess the impact of HS2 for the Country section for all areas within the M25 and appropriate integration has been facilitated.

Background traffic growth

- 7.2.8 Future baseline flows used in the construction (2021) and operational (2026 and 2041) assessments take account of the following:
- TEMPRO growth; and
 - suitable adjustments to account for specific committed developments and transport schemes.
- 7.2.9 Transport schemes include:
- committed local transport infrastructure improvements covering highways, buses, railways, canals and public rights of way; and
 - committed operational enhancements to rail and bus services.
- 7.2.10 The identification of specific developments in proximity to the Proposed Scheme that might require explicit consideration in the quantification of background traffic growth was in accord with DfT Guidance on Transport Assessments (2007)¹ and involved:
- a desk-top review of relevant local planning policy emerging from Local Development Frameworks/Local Plans;
 - review of planning applications within 1km of the centreline of the Proposed Scheme; and
 - engagement with local authorities to identify specific committed developments for consideration.
- 7.2.11 Specific instances, each of which addressed in more detail within the relevant CFA, include:

¹ i.e. developments that have extant planning permission, are included in development plan allocations in an adopted or approved plan or specifically advised by local highway authorities.

- consented changes to the Energy from Waste Facility (EfW) at Greatmoor;
- the Radstone Fields development in Brackley; and
- a mixed use development at Silverstone.

- 7.2.12 Traffic generation from committed developments has only been added to background traffic growth where it is likely to have a direct impact on the transport impacts of the Proposed Scheme and is not already reflected in the background traffic growth from local development already assumed by TEMPRO or local traffic models. The latter minimises the extent of double counting in the traffic growth forecasts, but there remains some risk since TEMPRO already takes into account the totality of local development even if not its precise location. This will mean that adverse impacts may be over-stated.
- 7.2.13 No region-wide transport schemes were identified that would be considered likely to affect the assessment. Committed transport schemes that are likely to affect the assessment at a local level are considered within each CFA.

Modelling Framework

Assumptions

- 7.2.14 The impact of the Proposed Scheme through the Country section was wholly appraised through local modelling exercises.
- 7.2.15 The purpose of all of the modelling and assessment work was to ensure that the impacts of the construction and operation of the Proposed Scheme were duly considered, inclusive of:
- providing substantive analysis for the TA;
 - establishing the likely impact and possible traffic and transport mitigation required;
 - supporting the EIA process including the provision of traffic data to inform other assessments;
 - informing the engineering design of the Proposed Scheme for both the construction and operational phases of the project; and
 - informing engagement with planning authorities and other stakeholders throughout the development and passage of the HS2 hybrid Bill.
- 7.2.16 The modelling and assessment work undertaken for the Country section is robust because it:
- was undertaken respecting applicable guidance;
 - used appropriate and suitably robust tools, which in the context of the Country section didn't need to take the full variety of demand generation and responses into account;

- was subject to appropriate quality assurance checks; and
- used an objective methodology to reach conclusions.

Framework

7.2.17 Appraisal techniques used in the Country section included:

- use of TEMPRO to provide locally relevant traffic growth factors;
- spreadsheet-based link volume to capacity estimates;
- local traffic modelling using ARCADY, PICADY and LNSIG; and
- available outputs from the HA's M25 and TfL's WeLHAM highways models.

7.2.18 With the exception of the Colne Valley (CFA7), forecast future year traffic flows with and without the Proposed Scheme were based on an approach that does not take into account of strategic transport network effects; e.g. redistribution and reassignment of traffic and modal shift and peak spreading. As a consequence, local transport impacts may be over-stated.

7.2.19 Within Colne Valley (CFA7), future baseline traffic volumes were derived from the HA's M25 and TfL's WeLHAM highways models as follows:

- 2021, 2026 and 2041 future baseline traffic volumes for the M25 and M25 slip roads have been derived from the HA's M25 transport model; and
- 2021, 2026 and 2041 future baseline traffic volumes for Harvil Road, B467 Swakeleys Road and A40 Western Avenue were obtained from the TfL's WeLHAM highways model.

Junction modelling

7.2.20 Junction modelling was generally undertaken using off-the-shelf traffic modelling software packages and data collected in specially commissioned surveys. However, this was not always possible and a 'rule of thumb' approach based upon professional judgment was used with junctions assessed quantitatively taking main road flow, side road flows and standard assumptions concerning, geometry, visibility, turning proportions and theoretical capacities into account. In practice, this involved relating main road flow, side road flow and 85 per cent saturation.

Public transport assessment

7.2.21 The approach to assessing the impact of the Proposed Scheme on the public transport network within the Country section (CFA 7 - 22) was undertaken as follows:

- a desk-top study to establish all public transport routes that could be impacted by the Proposed Scheme;
- assessing the impact upon public transport services based upon changes to journey

length and/or journey time as a result of construction or operation of the Proposed Scheme;

- assessing the impact upon public transport users, based upon the frequency of the service and/or duration of change to that service; and
- assessing rail possessions required as a result of construction of the Proposed Scheme.

7.2.22 Since it is not realistic to forecast how services may change in the future, bus services in future assessment years without the Proposed Scheme are assumed to be the same as those currently operating.

PRoW assessment

7.2.23 The approach to assessing the impact of the Proposed Scheme on PRoW within the Country section was undertaken as follows:

- a desk-top study to establish all PRoW that could be impacted by the Proposed Scheme;
- assessing the impact upon non-motorised users based upon changes to journey length and/or journey time as a result of construction or operation of the Proposed Scheme; and
- assessing the impact upon users, taking into account the number of vulnerable users affected by the change to PRoW.

7.2.24 There is no accurate means to forecast changes in PRoW usage over time. Consequently, the number of PRoW users was considered to remain the same for future years of assessment as existing.

7.3 Colne Valley (CFA7)

Colne Valley (CFA7) Proposed Scheme description

- 7.3.2 The Proposed Scheme through the Colne Valley area will be approximately 5.7km in length. It will commence from the boundary of a re-aligned Harvil Road, north of Ickenham and will proceed north-west on a viaduct through the Colne Valley, passing west of South Harefield and east of Denham Green, over the Grand Union Canal, Mid Colne Valley SSSI, River Colne, a number of lakes and A412 Denham Way/North Orbital Road. The route will then continue in a north-west direction passing west of West Hyde in a series of cuttings and embankments before entering the Chiltern tunnel via the Chiltern tunnel south portal, immediately east of the M25. The Proposed Scheme will leave this area in a tunnel at the M25, between junctions 16 and 17, east of Chalfont St Peter.
- 7.3.3 The Colne Valley study area includes the M25, M40, A40 Western Avenue, A413 Amersham Road, A405/A412 Denham Way/North Orbital Road, B467 Swakeleys Road and local roads that are affected by the Proposed Scheme. The Proposed Scheme crosses four roads within the study area.
- 7.3.4 There are two railway lines within the area. The Marylebone to Aylesbury Line runs east to west to the north of the Proposed Scheme and there is a passenger rail station at Rickmansworth. The Chiltern Main Line runs east to west, to the south of the Proposed Scheme. There are passenger rail stations at Denham and Denham Golf Club.
- 7.3.5 The Proposed Scheme crosses the Grand Union Canal, which runs north-south through the centre of the area and is primarily used for recreational use.
- 7.3.6 PRoW within the study area include the Colne Valley Trail, Grand Union Canal Walk and the Hillingdon Trail, all of which follow the course of the canal. The Proposed Scheme crosses five PRoW in the study area. In addition to the five PRoW, the Proposed Scheme also crosses four roads with potential for use by non-motorised users.
- 7.3.7 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.3.8 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2, (CFA Report 7).

- 7.3.9 The Proposed Scheme will leave the South Ruislip to Ickenham area (CFA6) under the re-aligned Harvil Road overbridge and will continue north-west on the Colne Valley south embankment, Colne Valley viaduct and then onto the Colne Valley north embankment. This section of the Proposed Scheme will extend from the west of Harvil Road to north of DEN/3 - Shire Lane (bridleway). This section is approximately 3.9km long. The viaduct will carry the Proposed Scheme over the Colne Valley, passing above the Harefield No.2 Lake, Grand Union Canal, Savay Lake, Moorhall Road, Korda Lake, Long Lake, the River Colne and A412 Denham Way/North Orbital Road.
- 7.3.10 The Proposed Scheme will continue north-west from the Colne Valley north embankment and enter the Tilehouse Lane cutting. It will then continue onto the West Hyde embankment and enter the Chiltern tunnel south cutting. This section of the Proposed Scheme will extend to approximately 200m south of the M25. Key features of this section, which is approximately 1.6km long, will include:
- an overbridge, providing a realignment of Tilehouse Lane and Rickmansworth oo4 (bridleway) over the Proposed Scheme; and
 - a new access road to Denham Park Farm Quarry site from Tilehouse Lane Overbridge.

Chiltern tunnel cutting

- 7.3.11 From the Chiltern tunnel south cutting, the Proposed Scheme will continue north-west into the Chiltern tunnel south portal located approximately 200m east of the M25, between junctions 16 and 17. The Proposed Scheme will enter the Chiltern tunnel from the portal and will run in the tunnel for approximately 100m before leaving this area. A key feature of this section will include an access road connecting the tunnel portal to Chalfont Lane. This is in addition to the widening of Chalfont Lane, including improvement works to the junction of Chalfont Lane with A412 Denham Way/North Orbital Road, to allow for the construction and the future maintenance of the Proposed Scheme.
- 7.3.12 The Proposed Scheme will then continue into The Chalfonts and Amersham area (CFA8) in the Chiltern tunnel.

Colne Valley (CFA7) assessment methodology

- 7.3.13 The assessment methodology used is described in Section 5 and Section 7.2 of this Transport Assessment report. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday. Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The factors vary based upon individual road types and relevant wards.

- 7.3.14 Within this study area, future baseline traffic volumes for the M25 and M25 slip roads covering 2021, 2026 and 2041, have been derived from factors supplied by the Highways Agency. This is to ensure consistency with the Highways Agency's own forecasts for traffic growth on the M25. Future baseline traffic volumes for the following roads have been obtained from the WeLHAM transport model for 2021, 2026 and 2041 to ensure consistency with traffic modelling undertaken for the assessment of traffic impacts from the Proposed Scheme in London:
- Harvil Road;
 - B467 Swakeleys Road; and
 - A40 Western Avenue.
- 7.3.15 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading, except where traffic flows have been obtained from a strategic traffic model (e.g. the West London Highways Assessment Model (WeLHAM) transport model). As a consequence, local transport impacts may be over-estimated.
- 7.3.16 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.
- 7.3.17 The link capacities of roads within the study area have been analysed to identify any that are likely to experience traffic congestion in the future baseline, without the Proposed Scheme. Operation of the Proposed Scheme will not result in any additional traffic on roads within this study area. Therefore, link capacities have only been assessed for those roads affected by the Proposed Scheme during construction.
- 7.3.18 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021 baseline have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the threshold, speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Colne Calley (CFA7) future baseline

Key future baseline issues

- 7.3.19 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme.

- 7.3.20 The roads subject to assessment within the study area which will potentially experience peak period intermittent traffic congestion and delay in the 2021 future baseline situation, without Proposed Scheme traffic, are listed below.
- M25
 - A40 Western Avenue between Denham Roundabout and Swakeleys Roundabout
 - A412 Denham Avenue/North Orbital Road, between junction with A40 and junction with Moorfield Road; and
 - B467 Swakeleys Road, between junction with Harvil Road and A40 Western Avenue.

7.3.21 There are no other key future baseline issues identified within the study area.

Land use assumptions

- 7.3.22 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional localised traffic growth not accounted for by the growth factors previously described.
- 7.3.23 Within the study area, there are no committed developments which are considered to require adjustment to the Strategy Development Plan (SPD) quantums within TEMPRO, which already account for future development in the area.

Transport supply assumptions

- 7.3.24 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.
- 7.3.25 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.
- 7.3.26 The TEMPRO growth factors used in the study area are shown in Table 7-1.

Table 7-1: Colne Valley summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	5-9%	15-18%	27-33%
Maximum	7-11%	17-20%	32-39%
Average	6-10%	16-19%	29-36%

Traffic growth assumptions

- 7.3.27 Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, taking into account both TEMPRO, HA forecasts and traffic volumes obtained from the WELHAM transport model, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 6%-10%
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 19%
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 29%-33%

Strategic and local road network traffic flows

- 7.3.28 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are M25, M40, A40 Western Avenue, A405/A412 Denham Way/North Orbital Road, B467 Swakeleys Road, Harvil Road, Tilehouse Lane, Denham Green Lane, Chalfont Lane, Hornhill Road, Woodland Road, Moorhall Road/Moorfield Road and Chalfont Road.
- 7.3.29 Current (2012) and future year baseline traffic flows for 2021 for all roads within the study area impacted by the Proposed Scheme, are presented in
- 7.3.30 Table 7-2 and Table 7-3. Flows are also shown in the Baseline Survey Report in Annex B(iii).
- 7.3.31 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.

- 7.3.32 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area, are shown in
- 7.3.33 Table 7-2 and Table 7-3 for AM peak and PM peak flows respectively.
- 7.3.34 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-4 and Table 7-5 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.3.35 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-2: Colne Valley strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012		
		2012		2021					
		All vehicles	HGV	All vehicles	HGV				
M25 Junction 17	AC Offslip	930	58	995	62	65	7%		
	CW Offslip	343	20	367	21	24	7%		
	AC Onslip	527	15	564	16	37	7%		
	CW Onslip	524	8	561	9	37	7%		
M25 Junction 17 to 18	AC J18 to J17	5045	667	5398	714	353	7%		
	CW J17 to J18	5345	635	5719	679	374	7%		
M25 Junction 16 to 17	AC J17 to J16	4681	448	5009	479	328	7%		
	CW J16 to J17	5102	520	5459	556	357	7%		
B467 Swakeleys Road (Hillingdon)	NB	1373	50	1348	49	-25	-2%		
	SB	1192	104	1213	93	+21	2%		
A40 (between J1 and Swakeleys Rd junction) (Hillingdon)	EB	4034	211	4291	201	+257	+6%		
	WB	3818	249	4064	245	+246	+6%		
A40 (between J1 and A412 Denham Way) (Denham)	NB	1605	58	1597	59	-8	-1%		
	SB	2263	100	2309	100	+46	+2%		
A40 (between A412)	EB	1757	53	1854	54	+97	+5%		

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021			
		All vehicles	HGV	All vehicles	HGV		
Denham Way and A413) (Bakers Wood)	WB	1364	41	1399	41	+35	+3%
A412 Denham Way (between A40 and Moorfield Rd) (Denham)	NB	887	20	835	22	-52	-6%
	SB	1169	39	1099	37	-70	-6%
A412 Denham Way/ North Orbital Road (south of satellite compounds) (Denham Green)	NB	354	8	388	9	+34	10%
	SB	551	15	603	16	+52	10%
A412 Denham Way/ North Orbital Road (north of satellite compounds) (Denham Green)	NB	354	8	388	9	+34	10%
	SB	551	15	603	16	+52	10%
A412 Denham Way/ North Orbital Road (Maple Cross)	NB	418	16	458	18	+40	10%
	SB	715	28	783	31	+68	10%
A405 Denham Way/ North Orbital Road (North of A412)	NB	739	23	807	2	+68	9%
	SB	1169	71	1277	7	+108	9%
A412 Uxbridge Road (Mill End)	EB	621	20	675	2	+54	9%
	WB	845	18	919	2	+74	9%

Table 7-3: Colne Valley strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021			
		All vehicles	HGV	All vehicles	HGV		
M25 Junction 17	AC Offslip	499	20	524	21	25	5%

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012		
		2012		2021					
		All vehicles	HGV	All vehicles	HGV				
M25 Junction 17 to 18	CW Offslip	300	12	315	13	15	5%		
	AC Onslip	221	9	232	9	11	5%		
	CW Onslip	648	4	680	4	32	5%		
M25 Junction 16 to 17	AC J18 to J17	5298	451	5563	474	265	5%		
	CW J17 to J18	6691	503	7026	528	335	5%		
B467 Swakeleys Road (Hillingdon)	AC J17 to J16	5028	324	5279	340	251	5%		
	CW J16 to J17	6285	392	6599	412	314	5%		
A40 (between J1 and Swakeleys Rd junction) (Hillingdon)	NB	1	4	1	4	-7	-1%		
	SB	1	3	1	3	+7	1%		
	EB	4	1	4	1	+465	+11%		
	WB	4	1	4	1	+212	+5%		
A40 (between J1 and A412 Denham Way) (Denham)	NB	1	3	1	3	-20	-1%		
	SB	1	4	1	4	+62	+3%		

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012		
		2012		2021					
		All vehicles	HGV	All vehicles	HGV				
A40 (between A412 Denham Way and A413) (Bakers Wood)	EB	1	2	1	2	+121	+7%		
	WB	1	1	1	1	+40	+2%		
A412 Denham Way (between A40 and Moorfield Rd) (Denham)	NB	928	18	840	18	-88	-10%		
	SB	934	15	871	16	-63	-7%		
A412 Denham Way/ North Orbital Road (south of satellite compounds) (Denham Green)	NB	596	5	657	5	+61	+10%		
	SB	433	4	477	4	+44	+10%		
A412 Denham Way/ North Orbital Road (north of satellite compounds) (Denham Green)	NB	596	5	657	5	+61	+10%		
	SB	433	4	477	4	+44	+10%		
A412 Denham Way/ North Orbital Road (Maple Cross)	NB	810	12	893	13	+83	+10%		
	SB	412	9	454	10	+42	+10%		
A405 Denham Way/ North Orbital Road (North of A412)	NB	9	1	1	1	9	+10%		
	SB	7	2	7	3	7	+10%		
A412 Uxbridge Road (Mill End)	EB	9	1	1	1	8	+9%		

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012		
		2012		2021					
		All vehicles	HGV	All vehicles	HGV				
	WB	6	1	6	1	5	+9%		

Table 7-4: Colne Valley local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012		
		2012		2021					
		All vehicles	HGV	All vehicles	HGV				
Harvil Road (South Harefield)	NB	3	19	3	1	+5	+2%		
	SB	4	14	4	1	+33	+8%		
Moorhall Road/ Moorfield Road (South Harefield)	EB	426	3	4	1	+	10%		
	WB	530	2	5	1	+	10%		
Tilehouse Lane (West of Denham Way)	NB	6	0	6	0	+	10%		
	SB	133	1	1	2	+	10%		
Denham Green Lane (Denham Green)	NB	4	2	4	3	+	10%		

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021			
		All vehicles	HGV	All vehicles	HGV	2021	2021
	SB	7	2	7	2	+	10%
Chalfont Lane (East of M25)	EB	77	2	84	3	+	10%
	WB	55	1	60	0	+	10%
Chalfont Road (Maple Cross)	NB	2	0	302	1	+	10%
	SB	1	1	146	1	+	10%
Hornhill Road (east of Woodland Road) (Maple Cross)	NB	1	0	116	0	+	10%
	SB	1	0	129	0	+	10%
Woodland Road (Maple Cross)	EB	7	0	78	1	+	10%
	WB	1	0	155	0	+	10%
Hornhill Road (west of Woodland Road) (Maple Cross)	EB	1	0	132	0	+	10%

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012		
		2012		2021					
		All vehicles	HGV	All vehicles	HGV				
	WB	1	0	142	0	+	10%		

Table 7-5: Colne Valley local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012		
		2012		2021					
		All vehicles	HGV	All vehicles	HGV				
Harvil Road (South Harefield)	NB	365	14	3	1	+16	+4%		
	SB	4	8	4	8	-2	0%		
Moorhall Road/ Moorfield Road (South Harefield)	EB	427	3	4	3	+4	+10%		
	WB	435	2	4	2	+4	+10%		
Tilehouse Lane (West of Denham Way)	NB	18	0	2	0	+2	+10%		
	SB	18	1	2	1	+2	+10%		
Denham Green Lane (Denham Green)	NB	4	2	5	2	5	+10%		

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021			
		All vehicles	HGV	All vehicles	HGV	2021	2021
	SB	5	2	6	2	6	+10%
Chalfont Lane (East of M25)	EB	46	2	51	2	+5	+10%
	WB	68	1	75	1	+7	+10%
Chalfont Road (Maple Cross)	NB	1	0	174	0	+1	+10%
	SB	2	1	235	1	+2	+10%
Hornhill Road (east of Woodland Road) (Maple Cross)	NB	8	0	97	0	+9	+10%
	SB	8	0	92	0	+8	+10%
Woodland Road (Maple Cross)	EB	1	0	125	0	+1	+10%
	WB	6	0	69	0	+6	+10%
Hornhill Road (west of Woodland Road) (Maple Cross)	EB	9	0	107	0	+1	+10%
	WB	9	0	109	0	+1	+10%

Colne Valley (CFA7) Proposed Scheme construction description

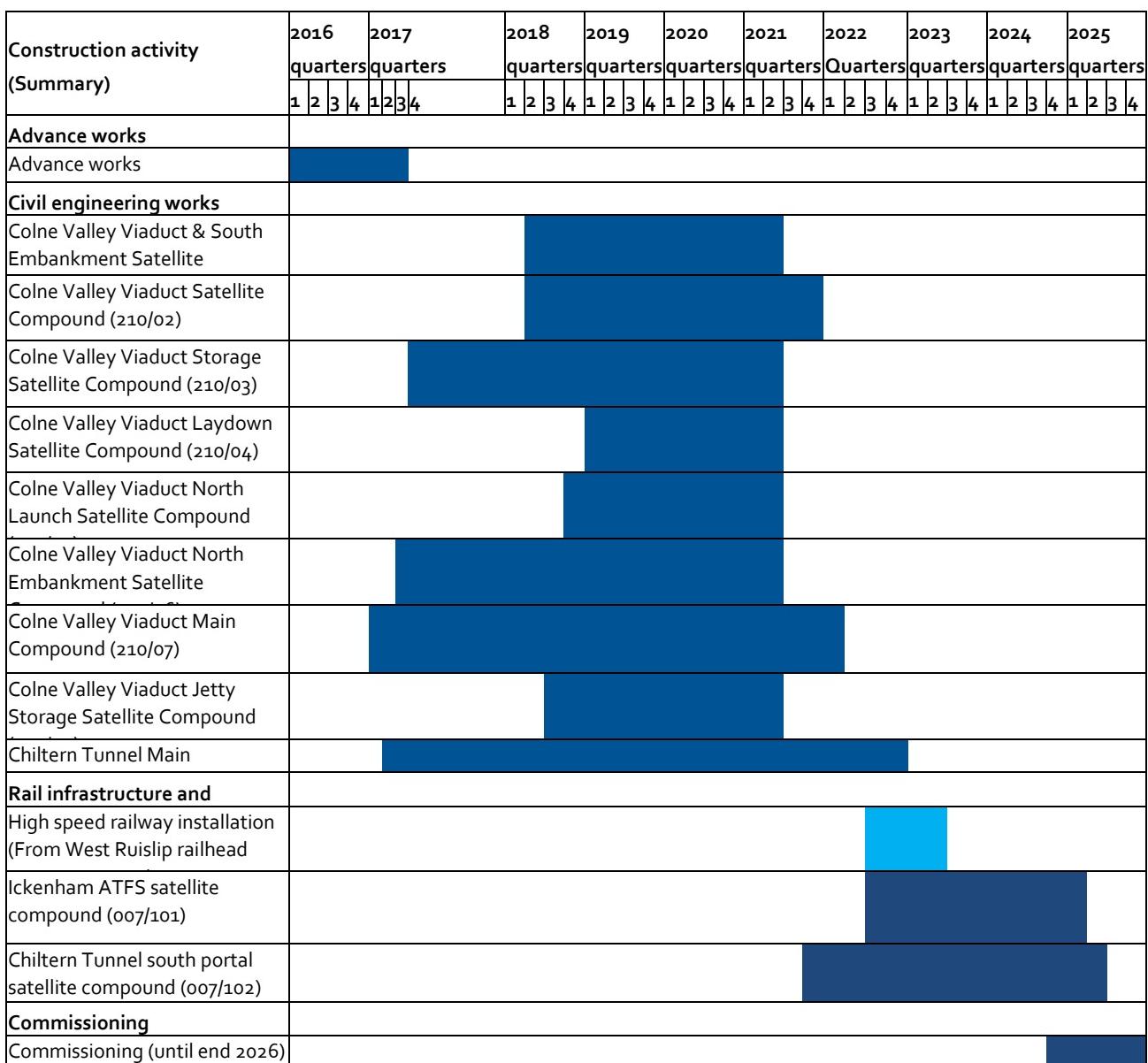
Construction activities

7.3.36 The major construction elements within the study area are as follows:

- Colne Valley viaduct and approach embankments;
- Tilehouse Lane cutting, West Hyde embankment and Chiltern tunnel south cutting; and
- Chiltern tunnel.

7.3.37 Details of the construction phasing are provided in Volume 2, Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-1.

Figure 7-1: Colne Valley construction activity phasing



Compounds and construction sites

- 7.3.38 Main site compounds will be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds will generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.3.39 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-6. The only compound in the study area with shift working (24 hours) is the Chiltern tunnel main compound, where there will be approximately 200 workers per shift.
- 7.3.40 The locations of compounds are shown on Map CT-05-019b to CT-05-023a (Volume 2, Map Book 7).

Table 7-6: Colne Valley assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Main	Colne Valley viaduct	75	198
Satellite	Colne Valley viaduct and south embankment	35	53
Satellite	Ickenham auto-transformer feeder station	33	58
Satellite	Colne Valley viaduct	13	13
Satellite	Colne Valley viaduct storage	33	37
Satellite	Colne Valley viaduct jetty storage	12	12
Satellite	Colne Valley viaduct laydown	12	12
Satellite	Colne Valley viaduct north launch	35	35
Satellite	Colne Valley north embankment	40	65

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Main	Chiltern tunnel	253	306
Satellite	Chiltern tunnel south portal (rail systems)	47	118

Construction trip assumptions

Trip generation

- 7.3.41 The duration of when there will be busy transport activity at each site is shown in Table 7-7. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-7: Colne Valley typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Main	Colne Valley viaduct	M25, A412 Denham Way/North Orbital Road and Chalfont Lane and temporary M25 slip roads from the east and the M40, A40, A412 and Chalfont Lane from the west	2017	Five years	51 months	80-120	10-20

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Colne Valley viaduct and south embankment	A40, B467 Swakeleys Road and Harvil Road and/or via the M40, A40, A412 Denham Way/North Orbital Road, Moorhall Road and Harvil Road from the west	2018	Six years and six months	11 months	90-140	40-60
Satellite	Ickenham auto-transformer feeder station						
Satellite	Colne Valley viaduct	A40, B467 Swakeleys Road and Harvil Road and/or via the M40, A40, A412 Denham Way/North Orbital Road, Moorhall Road and Harvil Road from the west	2018	Three years and six months	40 months	10-20	10-20
Satellite	Colne Valley viaduct storage	M40, A40, A412 Denham Way/North Orbital Road and Moorhall Road	2017	Three years and nine months	41 months	50-60	20-30
Satellite	Colne Valley viaduct jetty storage	M40, A40, A412 Denham Way/North Orbital Road and Moorhall Road	2018	Two years and nine months	29 months	10-20	10-20
Satellite	Colne Valley viaduct	A412 Denham Way/North	2019	Two years and three	26 months	10-20	10-20

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
	laydown	Orbital Road northwards to the M25 Junction 17 or via the A412, Chalfont Lane and temporary M25 slip roads		months			
Satellite	Colne Valley viaduct north launch	A412 Denham Way/North Orbital Road, A40 and M40 to the west and/or Chalfont Lane from the M25 via the M25 temporary slip roads and, A412 from the east	2017	Three years and six months	14 months	230-280	10-20
Satellite	Colne Valley north embankment	A412 Denham Way/North Orbital Road, A40 and the M40 to the west and/or Chalfont Lane from the M25 via the M25 temporary slip roads and A412 from the east	2017	Three years and six months	23 months	50-60	50-60

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Main	Chiltern tunnel	A412 Denham Way/North Orbital Road, A40 and M40 to the west and/or Chalfont Lane from the M25 via the M25 temporary slip roads and A412 from the east					
Satellite	Chiltern tunnel south portal (rail systems)		2017	Eight years	Five months	400-440	860-920

7.3.42 Information on the indicative construction programme and methodology is provided in Figure 7-1, which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-7. Consequently the peak traffic movements will not generally occur at the same time, although in some instances there may be some overlap.

7.3.43 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment

7.3.44 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split will mean that vehicles generated by a particular compound will be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;
- for mass-haul traffic assignment, origins and destinations have been assessed

for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network.; and

- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

7.3.45 Within the study area, mass-haul movements have been assigned to M25 temporary slip roads, M25 (between J16 and J17), M40 (between M25 and A40 Western Avenue), A40 Western Avenue (between M40 and Swakeleys Roundabout), B467 Swakeleys Road (between Swakeleys Roundabout and Harvil Road) and Harvil Road (between B467 Swakeleys Road and the Proposed Scheme).

7.3.46 Within the study area, construction and workforce traffic have been assigned to the roads listed in the construction lorry routes section below.

7.3.47 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.

7.3.48 From the neighbouring areas to the north, including The Chalfonts and Amersham (CFA8), Central Chilterns (CFA9) and Dunsmore, Wendover and Halton (CFA10) areas, the cumulative construction traffic flows of approximately 102 cars/LGVs per day (two way) and 9 HGVs per day (two way) have been included in the assessment for this area. These flows have been assigned to the A413 and A40 (between A413 and A412).

7.3.49 From neighbouring areas to the south east, the cumulative average construction traffic flows of approximately 460 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to the A40 Western Avenue and B467 Swakeleys Road.

Construction lorry routes

7.3.50 Access routes to construction compound with the study area, will as far as reasonably practicable, be via the strategic highway network and using designated routes as described below and shown on Map TR-03-051 (Volume 5, Map Book 71):

- Colne Valley viaduct main compound will be accessed via M25, A412 Denham Way/North Orbital Road and Chalfont Lane and temporary M25 slip roads from the east and the M40, A40, A412 and Chalfont Lane from the west;
- Colne Valley viaduct and south embankment, and Ickenham auto-transformer feeder station satellite compounds will be accessed A40, B467 Swakeleys Road and Harvil Road and/or via the M40, A40, A412 Denham Way/North Orbital Road, Moorhall Road and Harvil Road from the west;

- Colne Valley viaduct satellite compound will be accessed via A40, B467 Swakeleys Road and Harvil Road and/or via the M40, A40, A412 Denham Way/North Orbital Road, Moorhall Road and Harvil Road from the west;
- Colne Valley viaduct storage satellite compound will be accessed via M40, A40, A412 Denham Way/North Orbital Road and Moorhall Road;
- Colne Valley viaduct jetty storage satellite compound will be accessed via M40, A40, A412 Denham Way/North Orbital Road and Moorhall Road;
- Colne Valley viaduct laydown satellite compound will be accessed via A412 Denham Way/North Orbital Road northwards to the M25 Junction 17 or via the A412, Chalfont Lane and temporary M25 slip roads;
- Colne Valley viaduct north launch satellite compound will be accessed via A412 Denham Way/North Orbital Road, A40 and M40 to the west and/or Chalfont Lane from the M25 via the M25 temporary slip roads and, A412 from the east;
- Colne Valley viaduct north embankment satellite compound will be accessed via Way/North Orbital Road, A40 and the M40 to the west and/or Chalfont Lane from the M25 via the M25 temporary slip roads and A412 from the east; and
- Chiltern tunnel main construction compound and Chiltern tunnel south portal (rail systems) satellite compound will be accessed via Way/North Orbital Road, A40 and M40 to the west and/or Chalfont Lane from the M25 via the M25 temporary slip roads and A412 from the east.

Traffic management, road closures and diversions

- 7.3.51 The roads in the study area that will be subject to temporary closure during construction of the Proposed Scheme are summarised in Table 7-8. Chalfont Lane will have a short term temporary diversion to allow for the construction of a new temporary link road, which will subsequently be used for the longer term temporary diversion and is therefore listed twice.
- 7.3.52 The approximate length of diversions listed is the 'worst case' scenario based on the maximum distance from one side of the road closure to the other. In reality, a proportion of vehicles diverted will be subject to a diversion distance less than what is reported.
- 7.3.53 Temporary closures and diversions of roads during construction are shown on Map CT-05-019b to Map CT—5-023a (Volume 2, Map Book 7).

Table 7-8: Colne Valley temporary road closures and diversions

Name	Location	Location (chainage)	Diversion route	Approximate length of diversions	Programme	Duration
Tilehouse Lane	West of Denham Way	029+950	A412 Denham Way/North Orbital Road and Denham Green Lane	5.2km	Sep 2017	Up to one year six months
Chalfont Lane	East of M25	030+800 - 031+600	A412 Denham Way/North Orbital Road, Woodland Road, Hornhill Road, Shire Lane, Rickmansworth Lane, Denham Lane and West Hyde Lane	6.1km	Jan 2017	Up to six months
Chalfont Lane	East of M25	030+800 - 031+600	A412 Denham Way/North Orbital Road, Woodland Road, Hornhill Road and the new temporary link road between Hornhill Road and Shire Lane/Chalfont Lane	1.6km	Jan 2017	Up to five years and six months

- 7-3.54 The temporary diversions will affect approximately 500 vehicles a day (12 hour 2021 base flow) on Tilehouse Lane and approximately 1,030 vehicles a day on Chalfont Lane.

PRoW closures and diversions

- 7-3.55 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-9.
- 7-3.56 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.
- 7-3.57 Temporary closures and diversions of PRoW during construction are shown on Map CT-05-019b to Map CT—5-023a (Volume 2, Map Book 7).

Table 7-9: Colne Valley temporary footpath, cycleway and bridleway closures and diversions

PRoW/ pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approximately rox.) and duration	Reason for diversion and diversion route
Footpath U75 - Colne Valley Trail (footpath, bridleway, cycleway)	Denham	026+900	Apr 2018	600m Up to three years and six months	Construction of Colne Valley viaduct Temporary offline diversion of the tow path on the west side of the canal across PRoW U50 to the existing tracks/pathways U35 on the east side, London Loop Trail & Moorhall Road. Possible conflict with viaduct temporary works.

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approximately rox.) and duration	Reason for diversion and diversion route
DEN/3 - Shire Lane (bridleway)	West Hyde	29+550	Oct 2017	1 km Up to three years and six months	Construction of Colne Valley Viaduct and adjacent embankment. Temporary diversion along Tilehouse Lane, DEN/P1/1 and verge of A412 underneath Colne Valley viaduct.
Old Shire Lane Circular Walk	West Hyde	29+550	Oct 2017	1 km Up to three years and six months	Construction of Colne Valley Viaduct and adjacent embankment. Temporary diversion along Tilehouse Lane, DEN/P1/1 and verge of A412 underneath Colne Valley viaduct.
Tilehouse Lane	West Hyde	29+950	Sep 2017	1.4km Up to one year and six months	Construction of Tilehouse Lane overbridge Temporary diversion along A412 North Orbital Road DEN/P1 and Tilehouse Lane.
CSP/44	West Hyde	030+000 - 031+400	Jan 2017	Temporary closure of PRoW. Up to five years and six months	Temporary stockpile and site for the construction of Chiltern Tunnel Temporary closure of PRoW.
Public Bridleway CSP/43/2 Shire Lane	West Hyde	030+000 - 031+400	Jan 2017	1.2km Up to five years and six months	Temporary stockpile and site for the construction of Chiltern Tunnel Temporary closure of a section of PRoW, with remaining section of footpath temporarily diverted to the south.
Bridleway DEN/2 - Shire Lane	West Hyde	030+000 - 031+400	Jan 2017	1.2km Up to five years and six months	Temporary stockpile and site for the construction of Chiltern Tunnel Temporary stop up of a section of PRoW, with remaining section of footpath temporarily diverted to the south.
Rickmansworth 004 (bridleway)	West Hyde	30+450	Jan 2017	Temporary closure of PRoW. Up to five years and six months	Temporary stockpile and site for the construction of Chiltern Tunnel Temporary closure of PRoW.
Chalfont Lane	West Hyde	31+000	Jan 2017	1.75 km or 2km upon completion of temporary link road. Up to five years and six months	Road will be closed to the public during construction of the Chiltern Tunnel. Temporary diversion along A412 North Orbital Road, Woodland Road and Hornhill Road and Shire Lane/ temporary link road.

7.3.58 The following PRoW will be temporarily diverted by a negligible distance during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:

- U34 (footpath);
- U34 (footpath) (north of HOAC); and
- Footpath U75 (Grand Union Canal tow path).

7.3.59 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:

- U34 (footpath);
- DEN/3 - Shire Lane (bridleway);
- Old Shire Lane Circular Walk;
- Tilehouse Lane; and
- Rickmansworth oo4 (bridleway).

Utilities works

7.3.60 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area.

7.3.61 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necesasary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Major highways within the study area which will be affected by utility works are:

Avoidance and mitigation measures

7.3.62 Measures have been included as part of the engineering design of the Proposed Scheme that will avoid or reduce impacts on transport users:

- construction materials and equipment will be transported along a haul road within the land required for construction where reasonably practicable, to reduce lorry movements on the public highway;

- the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in reduced diversions of traffic onto alternative routes. Alternatives will be provided prior to any closures;
- providing temporary alternative routes or building structures early to maintain connectivity for PRoW closed during construction to reduce loss of amenity. Alternatives will be provided prior to any closures;
- providing on-site accommodation and welfare facilities to reduce daily travel by site workers; and
- HGV routeing will as far as reasonably practicable along the strategic road network and using designated routes for access, as shown in Map TR-03-051 (Volume 5, Map Book, Traffic and Transport).

7.3.63 The draft CoCP (see Volume 5: Appendix CT-003-000/1) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.3.64 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported through an overarching framework travel plan that will require travel plans to be used, along with a range of potential measures, to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practical this will encourage the use of sustainable modes of transport or vehicle sharing. The reductions in traffic generation arising from the travel plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.

7.3.65 The measures in the draft CoCP (Section 14.2) will include clear controls on vehicle types, hours of site operation and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.

7.3.66 Specific measures will include:

- core site operating hours will generally be 08:00-18:00 on weekdays and 08:00 to 13:00 on Saturdays and site staff and workers will therefore generally arrive before the morning peak hour and depart after the evening peak hour (although the assessment has assumed that some work journeys to the

construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario). Tunnelling and directly associated activities (such as removal of excavated material, supply of materials and maintenance of tunnelling equipment) will be operational 24 hours a day. It is anticipated that shift changeover times would not coincide with the highway peak hours (draft CoCP, Section 5); and

- excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 14).

7.3.67 Rail replacement services will be provided when rail possessions are in place on the Marylebone to Aylesbury Line and the Chiltern Main Line, where appropriate. Where practicable rail possessions will be scheduled to coincide with other planned rail possessions for engineering and maintenance works on the same line to minimise additional disruption to rail users.

7.3.68 No other mitigation measures during construction of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Colne Valley (CFA7) construction impacts

Key construction transport issues

7.3.69 Construction of the Proposed Scheme in the study area will have temporary traffic and transport impacts as listed below. No other impacts are expected to traffic and transportation within this study area.

- construction vehicle movements to and from the construction compounds;
- temporary road closures and associated diversions of motorised users;
- temporary PRoW closures and associated diversions of non-motorised users; and
- short-term possessions of the Marylebone to Aylesbury Line.

7.3.70 No substantial traffic and transport impacts are expected on waterways, stations or interchanges, parking, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these are not considered further within this assessment.

Strategic and local road network traffic flows

7.3.71 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.

- 7.3.72 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-10 and Table 7-11 for AM peak and PM flows respectively.

Table 7-10: Colne Valley strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicle s	HGV	All vehicles	HGV	All vehicle s	HGV
				All vehicles					
M25 Junction 17	CW Offslip	343	367	486	128	119	106	32%	498%
	AC Onslip	527	564	671	123	107	106	19%	664%
	CW Onslip	524	561	564	11	3	3	1%	32%
M25 Junction 16 to 17 (north of temp slip roads)	AC J17 to J16	4681	5009	5116	586	107	106	2%	22%
	CW J16 to J17	5102	5459	5578	663	119	106	2%	19%
M25 Junction 16 to 17 (south of temp slip roads)	AC J17 to J16	4681	5009	5057	528	48	48	1%	10%
	CW J16 to J17	5102	5459	5508	605	48	48	1%	9%
B467 Swakeleys Road between Swakeleys roundabout and Harvil Rd	NB	1373	1348	1483	133	134	84	10%	171%
	SB	1192	1213	1302	177	88	84	7%	90%
A40 (between Denham Roundabout and Swakeleys Roundabout)	EB	4034	4291	4415	298	124	97	3%	48%
	WB	3818	4064	4165	343	101	97	2%	40%
A40 (between Denham Roundabout and A412)	NB	1605	1597	1685	64	88	6	6%	10%
	SB	2263	2309	2323	106	13	6	1%	6%
A412 Denham Avenue/North Orbital Rd (between A40 and Moorfield Rd)	NB	887	835	905	26	70	4	8%	19%
	SB	1169	1099	1103	41	4	4	0%	11%
A412 Denham Way/ North Orbital Rd (south of satellite compounds)	NB	354	388	456	13	69	4	18%	47%
	SB	551	603	819	22	216	6	36%	37%
A412 Denham Way/ North Orbital Rd (north of satellite compounds)	NB	354	388	398	13	10	4	3%	47%
	SB	551	603	811	22	208	6	35%	37%
A412 Denham Way/ North Orbital Rd (between Chalfont La and A405)	NB	418	458	462	22	4	4	1%	24%
	SB	715	783	853	35	70	4	9%	14%
A405 North Orbital Rd (between M25 and A412)	NB	739	807	811	29	4	4	1%	17%
	SB	1169	1277	1317	82	40	4	3%	5%

Table 7-11: Colne Valley strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction	2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
				All vehicle s	HGV	All vehicles	HGV	All vehicle s	HGVs
		All vehicles							
M25 Junction 17	CW Offslip	300	315	415	113	100	100	32%	794%
	AC Onslip	221	232	343	109	111	100	48%	1058%
	CW Onslip	648	680	704	5	23	1	3%	22%
M25 Junction 16 to 17 (north of temp slip roads)	AC J17 to J16	5028	5279	5391	440	111	100	2%	29%
	CW J16 to J17	6285	6599	6699	512	100	100	2%	24%
M25 Junction 16 to 17 (south of temp slip roads)	AC J17 to J16	4681	5009	5328	389	48	48	1%	14%
	CW J16 to J17	5102	5459	6648	460	48	48	1%	12%
B467 Swakeleys Rd between Swakeleys roundabout and Harvil Rd	NB	1125	1118	1203	124	85	84	8%	209%
	SB	1134	1141	1271	122	129	84	11%	215%
A40 (between Denham Roundabout and Swakeleys Roundabout)	EB	4411	4876	4974	245	98	97	2%	65%
	WB	4382	4594	4714	254	120	97	3%	62%
A40 (between Denham Roundabout and A412)	NB	1693	1673	1682	35	9	3	1%	8%
	SB	1837	1899	1979	47	80	3	4%	6%
A412 Denham Avenue/North Orbital Rd (between A40 and Moorfield Rd)	NB	928	840	841	19	1	1	0%	8%
	SB	934	871	935	18	64	1	7%	9%
A412 Denham Way/ North Orbital Rd (south of satellite compounds)	NB	596	657	740	6	84	1	13%	28%
	SB	433	477	554	6	76	2	16%	50%
A412 Denham Way/ North Orbital Rd (north of satellite compounds)	NB	596	657	733	6	76	1	12%	28%
	SB	433	477	499	6	21	2	4%	50%
A412 Denham Way/ North Orbital Rd (between Chalfont La and A405)	NB	810	893	957	15	64	1	7%	10%
	SB	412	454	456	11	1	1	0%	14%
A405 North Orbital Rd (between M25 and A412)	NB	977	1072	1107	16	35	1	3%	10%
	SB	723	793	794	31	1	1	0%	5%

7-3.73 During construction of the Proposed Scheme, temporary slip roads will be constructed to and from the M25, between junctions 16 and 17, for access to the Colne Valley viaduct and Chiltern tunnel main compounds, via Chalfont Lane. Forecast construction traffic flows for each temporary slip road, with all vehicles being HGVs, are shown in Table 7-12.

Table 7-12: Colne Valley 2021 M25 temporary slip road construction traffic flows

Location	Direction	Total Veh (HGVs)
M25 anti-clockwise (Temporary offslip to Proposed Scheme compounds)	AM peak	57
	PM peak	51
M25 clockwise (Temporary onslip to Proposed Scheme compounds)	AM peak	57
	PM peak	51

- 7.3.74 The M25 temporary slip roads will minimise additional HGV traffic during construction on A405/A412 Denham Way/North Orbital Road, between M25 and Chalfont Lane, through Maple Cross.
- 7.3.75 During the construction period there will also be a number of roads within the local network that will be affected by the proposed highway works including:
- Tilehouse Lane – temporary road closure where it intersects the Proposed Scheme and diversion of motorised users, to allow construction of Tilehouse Lane overbridge; and
 - Chalfont Lane - temporary road closure to public traffic between A421 Denham Way/North Orbital Road and Shire Lane and diversion of motorised users, to allow it to be used as a construction access road for the Colne Valley viaduct and Chiltern tunnel main compounds to and from the M25 temporary slip roads.
- 7.3.76 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-13 and Table 7-14 for AM peak and PM peak flows respectively.

Table 7-13: Colne Valley local road network construction traffic flows (vehicles) - AM peak

Location	Direction	2012 Base		2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All	vehicles	All	HGVs	All	HGVs	All	HGVs
Harvil Rd (between B467 Swakeleys Rd and Moorhall Rd)	NB	320	325	434	77	109	59	34%	328%
	SB	435	468	531	74	63	59	14%	403%
Moorhall Rd/ Moorfield Rd	EB	426	467	488	14	21	3	4%	28%
	WB	530	581	587	13	5	3	1%	31%
Denham Green Lane	EB	44	48	54	3	6	0	13%	0%
	WB	71	77	223	4	146	2	188%	83%
Chalfont Rd (between Hornhill Rd and	NB	276	302	344	2	42	1	14%	250%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
		All vehicles							
A412)	SB	133	146	176	1	30	0	20%	0%
Hornhill Rd (between Woodland Rd and Chalfont Rd)	NB	106	116	158	1	42	1	36%	0%
	SB	118	129	159	0	30	0	23%	0%
Woodland Rd	EB	72	78	120	2	42	1	53%	250%
	WB	141	155	184	0	30	0	19%	0%
Hornhill Rd (between Hornhill Rd and Woodland Rd)	EB	120	132	215	3	84	3	64%	0%
	WB	130	142	202	0	60	0	42%	0%

Table 7-14: Colne Valley local road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
		All vehicles							
Harvil Rd (between B467 Swakeleys Rd and Moorhall Rd)	NB	365	381	441	73	60	59	16%	417%
	SB	436	434	539	66	104	59	24%	776%
Moorhall Rd/ Moorfield Rd	EB	427	471	474	4	3	1	1%	38%
	WB	435	480	497	3	17	1	4%	60%
Denham Green Lane	EB	48	53	73	2	20	0	38%	0%
	WB	59	65	85	2	20	1	30%	33%
Chalfont Rd (between Hornhill Rd and A412)	NB	158	174	200	1	25	1	15%	0%
	SB	213	235	273	1	38	0	16%	50%
Hornhill Rd (between Woodland Rd and Chalfont Rd)	NB	88	97	122	1	25	1	26%	0%
	SB	84	92	130	0	38	0	41%	0%
Woodland Rd	EB	114	125	151	1	25	1	20%	0%
	WB	63	69	107	0	38	0	54%	0%
Hornhill Rd (between Hornhill Rd and Woodland Rd)	EB	97	107	158	2	51	2	47%	0%
	WB	99	109	184	1	75	1	69%	0%

- 7.3.77 Roads on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users (although in addition may also have an increase in other traffic generated by the construction of the Proposed Scheme) are:
- A412 Denham Way/ North Orbital Road (between Tilehouse Lane and Denham Green Lane), Denham Green Lane and Tilehouse Lane, for up to one year and six months from September 2017;
 - A412 Denham Way (between Chalfont Lane and Woodland Road), Woodland Road , Hornhill Road (between Woodland Road and Shire Lane), Shire Lane (between Hornhill Road and Rickmansworth Lane), Rickmansworth Lane (between Shire Lane and Roberts Lane), Roberts Lane (between Rickmansworth Lane and West Hyde Lane) and West Hyde Lane (between Chalfont Lane and Roberts Lane), for up to six months from January 2017; and
 - A412 Denham Way (between Chalfont Lane and Woodland Road), Woodland Road, Hornhill Road (between temporary link road and Woodland Road) and a new temporary link road, for up to five years and six months from January 2017.
- 7.3.78 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- M25 temporary slip roads;
 - M25 (between J16 and J17);
 - M40 (between M25 and A40 Western Avenue);
 - A40 Western Avenue (between M40 and Swakeleys Roundabout);
 - B467 Swakeleys Road (between Swakeleys Roundabout and Harvil Road); and
 - Harvil Road (between B467 Swakeleys Road and the Proposed Scheme).
- 7.3.79 The HGVs used for the transportation of construction materials and equipment, along with workforce traffic, will use designated lorry routes as described in Section 7.3.50. Some of these roads may also have an increase in other Proposed Scheme traffic.
- 7.3.80 The implementation of the draft CoCP (see Volume 5: Annex CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

Junction performance

- 7.3.81 The junctions within the study area which are considered to be impacted by the Proposed Scheme are:
- A412 Denham Way with Chalfont Lane;
 - A412 North Orbital Road with Woodland Road;
 - A412 North Orbital Road with Chalfont Road;
 - A412 Denham Way with A405 North Orbital Road and A412 Uxbridge Road;
 - A412 North Orbital Road with Denham Green Lane;
 - Harvil Road with Woodstock Drive;
 - B467 Swakeleys Road with Harvil Road; and
 - A40 Western Avenue with B467 Swakeleys Road.
- 7.3.82 Of the junctions above, A412 North Orbital Road with Denham Green Lane, A412 Denham Way with Woodland Road and A412 Denham Way with Chalfont Road are priority junctions which meet the junction assessment criteria. The 2021 traffic flows with Proposed Scheme traffic (in PCU) at these priority junctions are shown in Table 7-15 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

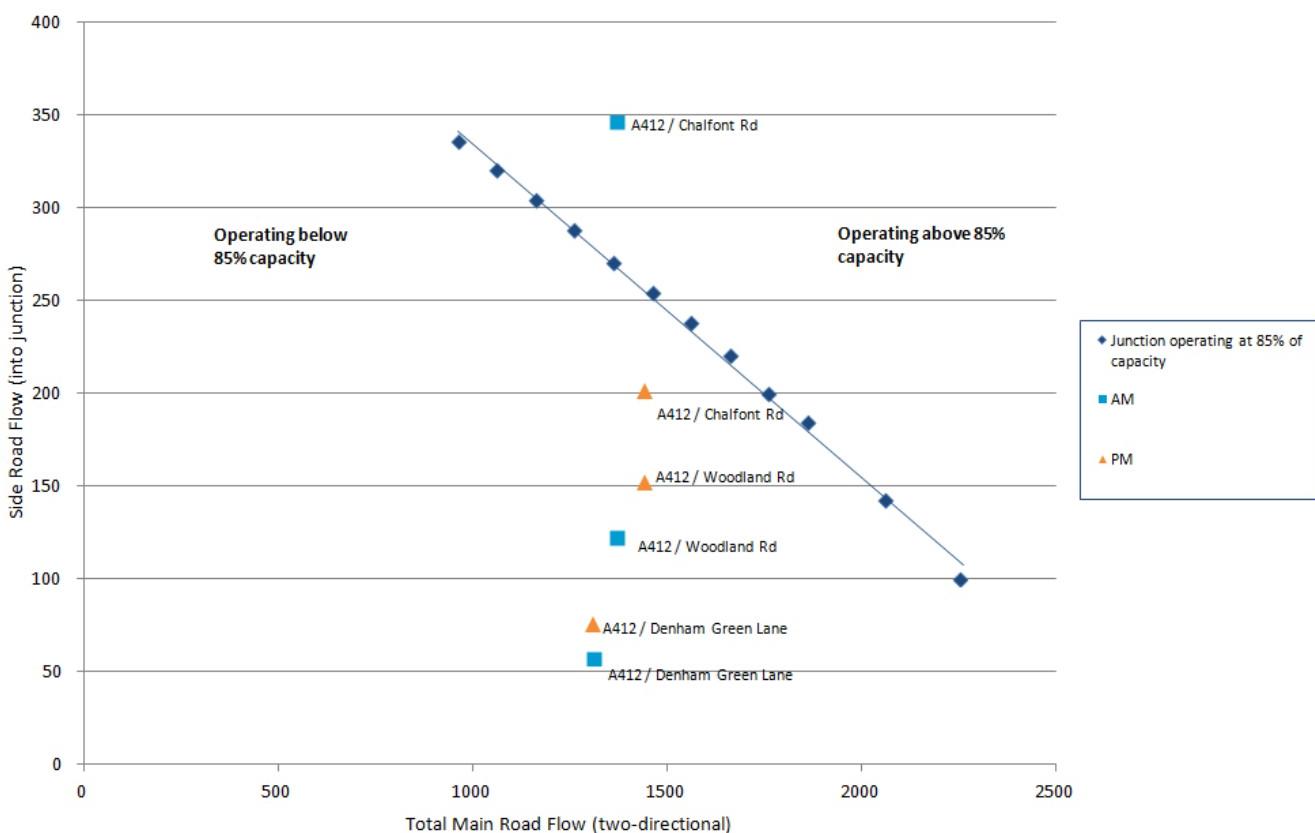
Table 7-15: Colne Valley priority junction flows

Junction	2021 With HS2 construction traffic			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A412 North Orbital Road/ Denham Green Lane	1310	57	1306	75
A412 Denham Way/ Woodland Road	1372	122	1439	152
A412 Denham Way/ Chalfont Road	1372	346	1439	201

- 7.3.83 The priority junctions have been plotted on a graph, shown in Figure 7-2, that shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

- 7.3.84 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-2: Colne Valley priority junction assessment 2021



- 7.3.85 The graph illustrates that nearly all affected priority junctions in the study area fall below the 'threshold' of capacity during both AM and PM peaks (apart from A412 with Chalfont Road) and are therefore not forecast to be close to their theoretical capacity of 85% during construction of the Proposed Scheme. As a result, they are not considered to warrant individual assessment and have therefore not been assessed with junction assessment software.
- 7.3.86 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the junction of A412 with Chalfont Road in the AM peak period during construction of the Proposed Scheme. This may be mitigated through the measures detailed in the draft CoCP, as previously outlined in this section.

7.3.87 The A412 Denham Way with A405 North Orbital Road and A412 Uxbridge Road and A412 Denham Way with Chalfont Lane non-priority junctions have been modelled using industry standard software for the 2021 year of assessment, with and without the Proposed Scheme. The results, shown in Table 7-16 and Table 7-17, have been presented in terms of ratio of flow to capacity and maximum queue lengths to establish the impact of Proposed Scheme traffic during construction upon junction operation

Table 7-16: Colne Valley area comparison forecast baseline and construction scenario performance at A412 Denham Way/Chalfont Lane junction (mini-roundabout)

0800-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
Chalfont Lane (E)	239	29%	1	239	30%	1
A412 (S)	476	32%	1	484	32%	1
Chalfont Lane (W)	87	13%	1	87	13%	1
A412 (N)	814	47%	1	888	51%	2
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Chalfont Lane (E)	371	36%	1	371	36%	1
A412 (S)	906	63%	2	972	67%	2
Chalfont Lane (W)	53	13%	1	53	14%	1
A412 (N)	464	26%	1	467	26%	1

Table 7-17: Colne Valley area comparison forecast baseline and construction scenario performance at A412 Denham Way/A405 North Orbital Road/A412 Uxbridge Road junction (priority roundabout)

0800-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A412 (N) Uxbridge Road	939	50%	1	969	52%	2
A412 (S) Denham Way	476	19%	1	484	19%	1
A405 North Orbital Road	1355	53%	2	1399	55%	2

17:00-18:00	2021 baseline			2021 With HS2 construction traffic			
	Approach (from)	Flow (all PCU)	Flow/capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A412 (N) Uxbridge Road		693	31%	1	693	31%	1
A412 (S) Denham Way		906	35%	1	972	38%	1
A405 North Orbital Road		823	34%	1	825	34%	1

- 7.3.88 The modelling results indicate that A412 Denham Way with Chalfont Lane junction is predicted to operate well within capacity during construction of the Proposed Scheme, with the highest percentage of flow to capacity predicted as 67% on the A412 (S) arm in the PM Peak. As this is well below 85%, (considered to represent theoretical capacity), the impact of the Proposed Scheme is not considered to have a substantial impact on capacity at this junction. The flow to capacity percentage is predicted to increase by 4% at most between the baseline and with construction scenarios, which is not considered to represent a substantial increase.
- 7.3.89 Likewise, the modelling results indicate that A412 Denham Way with A405 North Orbital Road and A412 Uxbridge Road junction is predicted to operate well within capacity during construction of the Proposed Scheme, with the highest percentage of flow to capacity predicted as 55% on the A405 North Orbital Road arm in the AM Peak. As this is well below 85%, the impact of the Proposed Scheme is not considered to have a substantial impact on capacity at this junction. The flow to capacity percentage is predicted to increase by 3% at most between the baseline and with construction scenarios, which is not considered to represent a substantial increase.
- 7.3.90 In addition to the junctions above which meet the assessment criteria and are therefore considered to be affected by the Proposed Scheme, junction modelling has been carried out on M25 junction 17 within the study area. The results are presented in Table 7-18, in terms of percentage of flow to capacity and maximum queue in PCU.

Table 7-18: M25 comparison forecast baseline and construction scenario performance at M25 Junction 17 junction (priority roundabout)

0800-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
M25 (clockwise exit)	1055	52%	2	1084	60%	2
A405 North Orbital Road	793	26%	1	797	28%	1
M25 (anti-clockwise exit)	388	21%	1	637	33%	1
Long Lane	378	19%	1	380	21%	1
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
M25 (clockwise exit)	544	23%	1	546	25%	1
A405 North Orbital Road	997	32%	1	1032	36%	1
M25 (anti-clockwise exit)	328	21%	1	528	33%	1
Long Lane	120	6%	0	124	7%	0

7.3.91 The modelling results indicate that M25 junction 17 is predicted to operate well within capacity during construction of the Proposed Scheme, with the highest percentage of flow to capacity predicted as 60% on the M25 (clockwise exit) arm in the AM Peak. As this is well below 85%, (considered to represent theoretical capacity), the impact of the Proposed Scheme is not considered to have a substantial impact on capacity at this junction. The flow to capacity percentage is predicted to increase by 12% at most between the baseline and with construction scenario.

7.3.92 A qualitative assessment has been carried out for the Harvil Road with Woodstock Drive, B467 Swakeleys Road with Harvil Road and A40 Western Avenue with B467 Swakeleys Road non-priority junctions, which meet the assessment criteria, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows (including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.

- 7.3.93 The assessment indicates that increased traffic during the most intensive periods of construction is unlikely to cause additional intermittent traffic congestion and delay at the Harvil Road with Woodstock Drive junction, although it may potentially cause additional intermittent traffic congestion and delay at the B467 Swakeleys Road with Harvil Road and A40 Western Avenue with B467 Swakeleys Road junctions during peak periods.

Accidents and safety

- 7.3.94 The Proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Rail

- 7.3.95 The Marylebone to Aylesbury Line is a 63km railway line between London and Aylesbury, operated by Chiltern Railways. A frequent service is provided with two to four passenger trains during peak hours and two per hour at other times during the day. Services run seven days a week.

- 7.3.96 The Chiltern Main Line is an inter-urban, regional and commuter railway, connecting London and Birmingham, operated by Chiltern Railways. A frequent service is provided with two passenger trains during peak hours from Marylebone to High Wycombe, two semi-fast trains per hour from Marylebone to Princes Risborough (one) and Bicester North (one) and two fast trains per hour from Marylebone to Birmingham Moor Street. Services run seven days a week.

- 7.3.97 Within the study area the Marylebone to Aylesbury Line serves Rickmansworth station and the Chiltern Main Line serves Denham and Denham Golf Club stations.

- 7.3.98 The construction of the Proposed Scheme will not require temporary rail possessions in this study area. However, there will be rail possessions further north on the Marylebone to Aylesbury Line and to the south on the Chiltern Main Line at West Ruislip, which will affect some users of passenger services stopping at stations in this area. The possessions will be short-term and generally take place during mid-week nights or at weekends. Therefore the impacts of these possessions on rail users in this area are not forecast to be substantial.

Local bus and coach

- 7.3.99 Bus service 582, operated by Carousel Buses, on Saturdays at a frequency of one service per hour, currently travels along Tilehouse Lane, north of Denham Grenn. Whilst Tilehouse Lane will be temporarily closed, the service only travels up to the junction of Tilehouse Lane/Wyatts Covert before turning back again, which is prior to the point of temporary closure, and therefore will not be impacted during the construction of the Proposed Scheme.

- 7.3.100 Other bus and coach services will not be impacted by construction of the Proposed Scheme except as a result of potential additional traffic congestion and delay at locations identified above.

Pedestrians, cyclists and equestrians

- 7.3.101 The review of PRoW links indicates there will be additional walking distances on seven routes due to temporary diversions, with all seven of the links requiring a diversion of more than 500m. Two PRoW will be temporarily stopped up during construction of the Proposed Scheme.
- 7.3.102 Table 7-19 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.3.103 Temporary closures and diversions of PRoW during construction are shown on Map CT-06-001 (Volume 2, Map Book 7).

Table 7-19: Colne Valley summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
Footpath U75 - Colne Valley Trail (footpath, bridleway, cycleway)	Denham	026+900	Construction of Colne Valley viaduct	Temporary offline diversion of the tow path on the west side of the canal across PRoW U50 to the existing tracks/pathways U35 on the east side, London Loop Trail & Moorhall Road. No further mitigation proposed.	51	600m	7min
DEN/3 - Shire Lane (bridleway)	West Hyde	29+550	Construction of Colne Valley Viaduct and adjacent embankment.	Temporary diversion along Tilehouse Lane, DEN/P1/1 and verge of A412 underneath Colne Valley viaduct. No further mitigation proposed.	24	1km	12min
Old Shire Lane Circular Walk	West Hyde	29+550	Construction of Colne Valley Viaduct and adjacent embankment.	Temporary diversion along Tilehouse Lane, DEN/P1/1 and verge of A412 underneath Colne Valley viaduct. No further mitigation proposed.	24	1km	12min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
Tilehouse Lane	West Hyde	29+950	Construction of Tilehouse Lane overbridge	Temporary diversion along A412 North Orbital Road DEN/P/1 and Tilehouse Lane. No further mitigation proposed.	13	1.4km	17min
CSP/44	West Hyde	030+000 - 031+400	Temporary stockpile and site for the construction of Chiltern Tunnel	Temporary closure of PRoW	9	Temporary closure of PRoW	Temporary closure of PRoW
Public Bridleway CSP/43/2 Shire Lane	West Hyde	030+000 - 031+400	Temporary stockpile and site for the construction of Chiltern Tunnel	Temporary closure of a section of PRoW, with remaining section of footpath temporarily diverted to the south.	20	1.2km	14min
Bridleway DEN/2 -Shire Lane	West Hyde	030+000 - 031+400	Temporary stockpile and site for the construction of Chiltern Tunnel	Temporary closure of a section of PRoW, with remaining section of footpath temporarily diverted to the south.	11	1.2km	14min
Rickmansworth 004 (bridleway)	West Hyde	30+450	Temporary stockpile and site for the construction of Chiltern Tunnel	Temporary closure of PRoW	20	Temporary closure of PRoW	Temporary closure of PRoW
Chalfont Lane	West Hyde	31+000	Road will be closed to the public during construction of the Chiltern	Temporary diversion along A412 North Orbital Road, Woodland Road and Hornhill Road and Shire Lane/temporary link road. No further mitigation proposed.	33	2km	24min

Colne Valley (CFA7) Proposed Scheme operation description

Operation trip assumptions

- 7.3.104 It is forecast that there will be no substantial changes in demand on existing transport infrastructure within the study area due to the Proposed Scheme in 2026 and 2041.

Avoidance and mitigation measures

- 7.3.105 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining all roads crossing the Proposed Scheme in their current location, or very close to their current location resulting in no diversions of traffic onto alternative routes; and
 - retaining all PRoW crossing the Proposed Scheme, with localised realignments or diversions.

- 7.3.106 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Colne Valley (CFA7) operation impacts

- 7.3.107 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.
- 7.3.108 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.

Key operation transport issues

- 7.3.109 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.
- Permanent realignment or closure of PRoW and associated diversions to non-motorised users.
- 7.3.110 No substantial traffic and transport impacts are expected on the highway network, waterways, rail services, stations or interchanges, public transport, parking, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.3.111 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.

- 7.3.112 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.
- 7.3.113 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows with the Proposed Scheme are expected to remain the same as the 2026 and 2041 future baseline traffic flows. Therefore, no traffic impact assessment of operation of the Proposed Scheme is necessary in this study area.

Accidents and safety

- 7.3.114 There will be no impact on highway accidents and safety risk in the study area as there are no increases in traffic due to operation of the Proposed Scheme.

Pedestrians, cyclists and equestrians

- 7.3.115 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.
- 7.3.116 The review of PRoW links indicates that there will be additional walking distances on five routes due to permanent realignments. None of these realigned links will require a diversion of more than 500m. The PRoW locations are shown on maps CT-06-019b – CT-06-022 (Volume 2, Map Book 7).
- 7.3.117 Table 7-20 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.

Table 7-20: Colne Valley summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
U34 (footpath)	Denham	026+100, 026+400	Reinstated on permanent diversion route following completion of Colne Valley viaduct works.	23	400m	5min
DEN/3 - Shire Lane (bridleway)	West Hyde	29+550	Reinstated on permanent diversion route with slight	24	270m	3min

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
			diversion around Heathrow Spur West Chord Box Structure.			
Old Shire Lane Circular Walk	West Hyde	29+550	Reinstated on permanent diversion route with slight diversion around Heathrow Spur West Chord Box Structure.	24	270m	3min
Tilehouse Lane	West Hyde	29+950	Permanent diversion to new overbridge at ch 30+200.	13	250m	3min
Rickmansworth 004 (bridleway)	West Hyde	30+450	Permanent diversion 200m east to share overbridge crossing of HS2 with Tilehouse Lane.	20	400m	5min

7.3.118 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

7.4 The Chalfonts and Amersham (CFA8)

The Chalfonts and Amersham (CFA8) Proposed Scheme description

- 7.4.1 The Proposed Scheme through this area will be entirely in the Chiltern tunnel, which will commence north of the M25 between junctions 16 and 17 and east of Chalfont St Peter, in the south-east. The route will then proceed north-west passing under two sections of Chalfont St Giles located on either side of River Misbourne and then pass approximately 1km to the north of Coleshill village. It will continue to the south of Amersham Old Town through to the junction of the A413 with Mop End Lane, west of Amersham. There will be three ventilation and intervention shafts (vent shafts) in this area, near Chalfont St Peter, Chalfont St Giles and Amersham respectively.
- 7.4.2 The Chalfonts and Amersham area includes the M25, A413 Amersham Road/London Road East/Amersham bypass, A355 Amersham Road/Gore Hill, A404 Whielden Lane/Amersham Road and local roads. The Proposed Scheme is in twin-bored tunnel within this area, and therefore does not cross any roads, however it does under 11 roads.
- 7.4.3 There are two railway lines within the area. The Marylebone to Aylesbury Line runs to the north of the Proposed Scheme and there are passenger rail stations at Amersham, Chalfont and Latimer and Chorleywood. The Chiltern Main Line runs east to west to the south of the Proposed Scheme. There are passenger rail stations at Gerrard's Cross, Seer Green, Beaconsfield and High Wycombe.
- 7.4.4 PRoW within the area include the South Buckinghamshire Way, Chiltern Way and Old Shire Lane Circular Walk. Cycleways include the Milton Route (part of the Chiltern Heritage Trail), which starts and finishes at Amersham. The Proposed Scheme is in bored tunnel within this study area, as such it goes under 15 PRoW.
- 7.4.5 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.4.6 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2, (CFA Report 21).
- 7.4.7 The Chalfont St Peter vent shaft will be located approximately 50m from Chesham Lane to the south of Ashwell's Farm and will include a short access road connecting the vent shaft compound to Chesham Lane.

- 7.4.8 The Chalfont St Giles vent shaft will be located in an open field south-west of Upper Bottom House Farm. Key features of this section will include the permanent widening of Bottom House Farm Lane to provide passing bays to allow for permanent access to the vent shaft compound. Improvement works will be carried out to the junction of Bottom House Farm Lane with the A413 Amersham Road. There will be a short access road connecting the vent shaft compound to Bottom House Farm Lane.
- 7.4.9 From the Chalfont St Giles vent shaft, the Proposed Scheme will continue north-west within the Chiltern tunnel, up to the A404 Whielden Lane, south of Amersham Old Town. The Amersham vent shaft will be located in the isolated parcel of land at the junction of the A404 Whielden Lane and the A413, south of Amersham Hospital. Key features of this section will include realignment of an existing cycleway along Whielden Lane between the A404 and Whielden Street and a short access road connecting the vent shaft compound to Whielden Lane.

The Chalfonts and Amersham (CFA8) assessment methodology

- 7.4.10 The assessment methodology used is described in Section 5 and Section 7.2 of this Transport Assessment report. The factors have been derived for the individual road types and relevant wards. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday. Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading. As a consequence, local transport impacts may be over-estimated.
- 7.4.11 The link capacities of roads within the study area have been analysed to identify any that are likely to experience traffic congestion in the future baseline, without the Proposed Scheme. Operation of the Proposed Scheme will not result in any additional traffic on roads within this study area. Therefore, link capacities have only been assessed for those roads affected by the Proposed Scheme during construction.
- 7.4.12 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021 baseline have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above this threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

The Chalfonts and Amersham (CFA8) future baseline

Key future baseline issues

- 7.4.13 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 9%-10%
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 15%-18%
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 32%-37%
- 7.4.14 Future baseline traffic flows have accounted for an increase in traffic on roads in the study area by up to 10% (2021) during construction of the Proposed Scheme and by up to 18% (2026) and 37% (2041) during operation of the Proposed Scheme. The roads subject to assessment within the study area which will potentially experience peak period intermittent traffic congestion and delay in the 2021 future baseline situation, without Proposed Scheme traffic, are listed below.
- A413 Amersham Bypass, westbound only, between junction with A355 Gore Hill and A404 Whielden Lane.
- 7.4.15 There are no other key future baseline issues identified within the study area.
- ### *Land use assumptions*
- 7.4.16 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional localised traffic growth not accounted for by the growth factors previously described.
- 7.4.17 Within the study area, there are no committed developments which are considered to require adjustment to the SPD quantums within TEMPRO, which already account for future development in the study area.
- 7.4.18 The TEMPRO growth factors used in the study area are shown in Table 7-21

Table 7-21: The Chalfonts and Amersham summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	9%	15%	32%
Maximum	10%	18%	37%
Average	9-10%	17%	35%

Transport growth assumptions

- 7.4.19 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.
- 7.4.20 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.

Strategic and local road network traffic flows

- 7.4.21 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are the M25, A413 Amersham Road/Amersham Bypass, A355 Amersham Road /Gore Hill, A404 Whielden Lane/Amersham Road, Chesham Lane, Denham Lane, Joiners Lane, Bottom House Farm Lane, Silver hill, Pheasant Hill, High Street (Chalfonts St Giles) and Bottrells Lane.
- 7.4.22 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B(iii) .
- 7.4.23 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.4.24 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area, are presented in Table 7-22 and Table 7-23 for AM peak and PM peak flows respectively.

- 7.4.25 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-24 and Table 7-25 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.4.26 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-22: The Chalfonts and Amersham strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A413 Amersham Road (Gerrards Cross)	NB	764	15	837	17	893	18	1037	20	+73	+129	+273	9%	17%	36%
	SB	795	65	871	71	929	76	1079	89	+76	+134	+284	9%	17%	36%
A413 Amersham Road (Chalfont St.Giles)	NB	784	12	855	13	912	14	1054	17	+71	+128	+270	9%	16%	34%
	SB	442	12	483	13	514	14	594	16	+41	+72	+152	9%	16%	34%
A355 Gore Hill/Amersham Rd (Coleshill)	NB	840	12	917	13	977	14	1129	16	+77	+137	+289	9%	16%	34%
	SB	936	7	1022	7	1089	8	1258	9	+86	+153	+322	9%	16%	34%
A413 Amersham Bypass (Amersham)	EB	1396	80	1539	88	1645	94	1924	110	+143	+249	+528	10%	18%	38%
	WB	876	80	965	88	1032	94	1207	110	+89	+156	+331	10%	18%	38%
A404 Whielden Lane (Amersham)	EB	874	45	964	50	1031	53	1205	62	+90	+157	+331	10%	18%	38%
	WB	733	5	808	5	864	6	1010	7	+75	+131	+277	10%	18%	38%
A413 Amersham Road (Little Missenden)	EB	1135	27	1237	30	1317	31	1520	36	+102	+182	+385	9%	16%	34%
	WB	659	12	718	13	765	14	883	16	+59	+106	+224	9%	16%	34%

Table 7-23: The Chalfonts and Amersham strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A413 Amersham Road, between B416 Kingsway and A40 Oxford Road (Gerrards Cross)	NB	975	9	1066	10	1141	11	1333	13	+91	+166	+358	9%	17%	37%
	SB	214	31	234	34	251	36	293	42	+20	+37	+79	9%	17%	37%
A413 Amersham Road, between High Street/Pheasant Hill and A404 Stanley Hill (Chalfont St.Giles)	NB	755	2	823	2	880	2	1024	3	+68	+125	+269	9%	17%	36%
	SB	282	1	308	1	329	1	383	1	+26	+47	+101	9%	17%	36%
A355 Gore Hill/Amersham Rd, between A413 Amersham Bypass and Leadborough Lane (Coleshill)	NB	939	6	1024	7	1094	7	1273	8	+85	+155	+334	9%	17%	36%
	SB	699	2	762	3	814	3	948	3	+63	+115	+249	9%	17%	36%
A413 Amersham Bypass, between A355 Gore Hill and A404 Whielden Lane (Amersham)	EB	868	33	958	37	1026	39	1208	46	+90	+158	+340	10%	18%	39%
	WB	1529	62	1686	68	1807	73	2127	86	+157	+278	+598	10%	18%	39%
A404 Whielden Lane (Amersham)	EB	602	20	664	22	712	24	838	28	+62	+110	+236	10%	18%	39%
	WB	915	5	1009	5	1081	6	1273	7	+94	+166	+358	10%	18%	39%
A413 Amersham	EB	591	9	643	10	687	11	797	12	+52	+96	+206	9%	16%	35%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Road (Little Missenden)	WB	1195	20	1301	22	1388	23	1612	27	+106	+193	+417	9%	16%	35%

Table 7-24: The Chalfonts and Amersham local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Joiners Lane (Chalfont St Peter)	EB	250	1	274	1	292	1	339	1	+24	+42	+89	10%	17%	36%
	WB	409	2	448	2	478	2	554	2	+39	+69	+145	10%	17%	36%
Chesham Lane/Denham Lane (Chalfont St Peter)	NB	120	1	132	1	141	2	163	2	+12	+21	+43	10%	17%	36%
	SB	174	0	190	0	203	0	236	0	+16	+29	+62	10%	17%	36%
Bottom House Farm Lane (Chalfont St Giles)	EB	2	0	2	0	2	0	3	0	+0	+0	+1	9%	16%	34%
	WB	2	0	2	0	2	0	2	1	+0	+0	+0	9%	16%	34%
High Street/Pheasant Hill (Chalfont St Giles)	NB	412	3	450	3	479	3	553	4	+38	+67	+141	9%	16%	34%
	SB	553	3	605	4	644	4	743	4	+52	+91	+190	9%	16%	34%
Silver Hill (Chalfont St Giles)	EB	66	1	72	1	77	1	89	1	+6	+11	+23	9%	16%	34%
	WB	101	0	111	0	118	0	136	0	+10	+17	+35	9%	16%	34%
Bottrells Lane	EB	15	0	16	0	17	0	20	0	+1	+2	+5	9%	16%	34%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
(Chalfont St Giles)	WB	42	0	46	0	49	0	57	0	+4	+7	+15	9%	16%	34%

Table 7-25: The Chilterns and Amersham local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Joiners Lane (Chalfont St Peter)	EB	275	0	301	0	322	0	375	0	+26	+47	+100	10%	17%	37%
	WB	168	0	184	0	197	0	230	0	+16	+29	+62	10%	17%	37%
Chesham Lane/Denham Lane (Chalfont St Peter)	NB	139	0	152	0	163	0	190	0	+13	+24	+51	10%	17%	37%
	SB	72	1	79	1	84	1	98	1	+7	+12	+26	10%	17%	37%
Bottom House Farm Lane (Chalfont St Giles)	EB	2	0	3	0	3	0	3	0	+1	+1	+1	9%	17%	36%
	WB	1	0	2	0	2	0	2	0	+1	+1	+1	9%	17%	36%
High St/Pheasant Hill (Chalfont St Giles)	NB	408	6	446	6	476	7	553	8	+38	+68	+145	9%	17%	36%
	SB	380	1	415	1	443	1	514	1	+35	+63	+134	9%	17%	36%
Silver Hill (Chalfont St Giles)	EB	96	0	105	0	112	0	130	0	+9	+16	+34	9%	17%	36%
	WB	59	0	65	0	69	0	80	0	+6	+10	+21	9%	17%	36%
Bottrells Lane	EB	13	0	14	0	15	0	17	0	+1	+2	+4	9%	17%	36%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
(Chalfont St Giles)	WB	13	0	14	0	15	0	17	0	+1	+2	+4	9%	17%	36%

The Chalfonts and Amersham (CFA8) Proposed Scheme construction

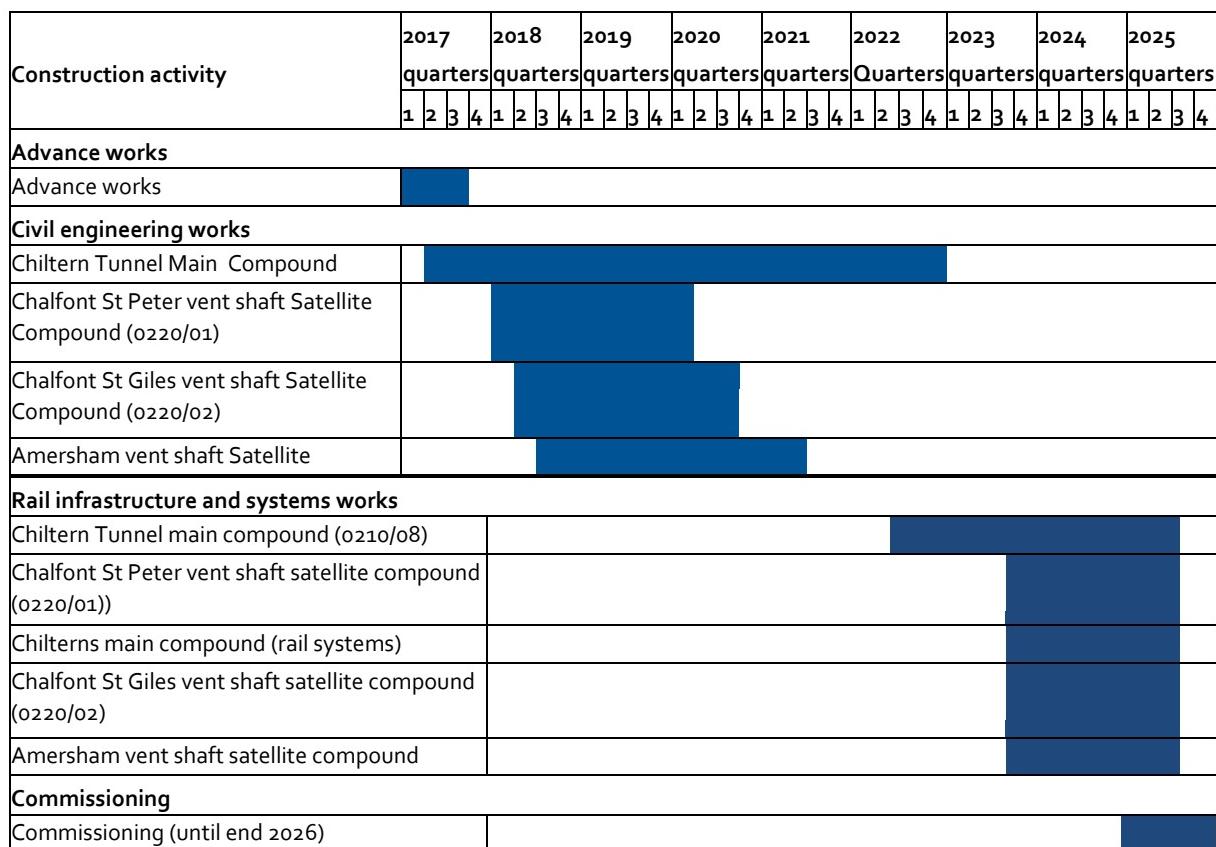
Construction activities

7.4.27 The major construction elements within the study area are as follows:

- Chiltern tunnel;
- Chalfont St Peter vent shaft;
- Chalfont St Giles vent shaft; and
- Amersham vent shaft.

7.4.28 Details of the construction phasing are provided in Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-3: The Chalfonts and Amersham construction activity phasing .

Figure 7-3: The Chalfonts and Amersham construction activity phasing



Compounds and construction sites

- 7.4.29 Main site compounds would be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds would generally be smaller in size, providing office accommodation for limited numbers of staff.
- 7.4.30 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-26. There are no compounds within the study area with shift working (24 hours).
- 7.4.31 The location of compounds are shown on Maps CT-05-023b to CT-05-030a (Volume 2, Map Book 8).

Table 7-26: The Chalfonts and Amersham assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of the construction programme	
		Average	Peak
Satellite	Chalfont St Peter vent shaft	32	66
Satellite	Chalfont St Giles vent shaft	30	62
Satellite	Amersham vent shaft	30	60

Construction trip assumptions

Trip generation

- 7.4.32 The duration of when there will be busy transport activity at each site is shown in Table 7-27. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-27: The Chalfonts and Amersham typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity.	
						Cars/LGV	HGV
Satellite	Chalfont St Peter vent shaft	Chesham Lane via Denham Lane and Joiners Lane and A413 Amersham Road	2018	seven years	eight months	90-100	<10-20
Satellite	Chalfont St Giles vent shaft	Upgraded Bottom House Farm Lane via the A413 Amersham Road	2018	seven years	12 months	80-100	20-40
Satellite	Amersham vent shaft	A404 Whielden Lane via A413 and A355 Gore Hill	2018	six years and six months	six months	80-100	90-100

7.4.33 Information on the indicative construction programme is provided in Figure 7-3: The Chalfonts and Amersham construction activity phasing which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-27. Consequently the peak traffic movements presented will not generally occur at the same time, although in some instances there may be some overlap.

Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

7.4.34 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the

strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;

- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network.; and
- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

7.4.35 Within the study area, mass-haul movements have been assigned to the A413 across the whole of the area.

7.4.36 Within the study area, construction and workforce traffic have been assigned to the roads listed in the construction lorry routes section below.

7.4.37 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.

7.4.38 From the neighbouring areas to the north, including the Central Chilterns (CFA9) and Dunsmore, Wendover and Halton (CFA10) areas, the cumulative average construction traffic flows of approximately 420 cars/LGVs per day (two way) and 100 HGVs per day (two way) have been included in the assessment for this area. These flows have been assigned to the A413. There is no additional traffic from the Colne Valley (CFA7) area to the south.

Construction lorry routes

7.4.39 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Map TR-03-052 (Volume 5, Map Book 71):

- Chalfont St Peter vent shaft satellite compound will be accessed via Chesham Lane via Denham Lane and Joiners Lane and A413 Amersham Road;
- Chalfont St Giles vent shaft satellite compound will be accessed via upgraded Bottom House Farm Lane via the A413 Amersham Road; and
- Amersham vent shaft satellite compound will be accessed via A404 Whielden Lane via A413 and A355 Gore Hill.

Traffic management, road closures and diversions

- 7.4.40 The roads in the study area that will be subject to temporary closure during construction of the Proposed Scheme are summarised in Table 7-28.
- 7.4.41 The approximate length of diversions listed is the 'worst case' scenario based on the maximum distance from one side of the road closure to the other. In reality, a proportion of vehicles diverted will be subject to a diversion distance less than what is reported.

Table 7-28: The Chalfonts and Amersham temporary road closures and diversions

Name	Location	Location (chainage)	Diversion route	Approximate length of diversions	Programme	Duration
Bottom House Farm Lane	Chalfont St Giles	036+800 - 037+400	Bottrells Lane, Silver Hill, High Street, Pheasant Hill and A413 Amersham Road	5.5km	May 2018	Up to six months

- 7.4.42 Bottom House Farm Lane will remain open during construction of the Proposed Scheme for local access to existing properties, with only through traffic being temporarily diverted.
- 7.4.43 The temporary diversion will affect less than 40 vehicles per day (12 hour 2021 base flow) on Bottom House Farm Lane and therefore the impact of the temporary diversion is not considered to be substantial.

PRoW closures and diversions

- 7.4.44 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-29.
- 7.4.45 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.

7.4.46 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-023b to CT-05-030a (Volume 2, Map Book 8).

Table 7-29: The Chalfonts and Amersham temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
CSG/32/1 (public footpath)	Chalfont St Peter	34+200	Jan 2018	100m Up to two years	Construction of Chalfont St Peter Ventilation Shaft. Temporary diversion south of shaft construction site boundary during construction
CSP/10/1 (public footpath)	Chalfont St Peter	34+200	Jan 2018	100m Up to two years	Construction of Chalfont St Peter Ventilation Shaft. Temporary diversion south of shaft construction site boundary during construction

7.4.47 The following PRoWs will also be temporarily diverted, however only by a negligible distance and are therefore not considered to be substantially impacted during construction of the Proposed Scheme:

- Old Link Road between Whielden Lane and A413 (Currently only allows access by cyclist and pedestrians).

7.4.48 The following PRoW may require a negligible local diversion or traffic management during construction of the Proposed Scheme. However, they remain open and are therefore not considered to be substantially impacted during construction:

- CSP/16/1 (public footpath);
- CSG/28/4;
- AMS/18/3 (public footpath);
- Bottom House Farm Lane;
- CSG/30/1; and
- AMS/16/2 (public footpath); and
- South Bucks Way.

7.4.49 The PRoW in the study area that will be subject to permanent closure or realignment is CSP/16/1 (public footpath), which is reported on in the operational scheme section of this report:

Utilities works

- 7.4.50 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area.
- 7.4.51 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. There are no major highways within the study area which are expected to be affected by utility works.

Avoidance and mitigation measures

- 7.4.52 The following measures have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in a reduced number of lengthy diversions of traffic onto alternative routes;
 - provision of temporary alternative routes and/or building structures early to maintain connectivity for PRoW closed during construction to reduce loss of amenity; and
 - HGV routeing as far as reasonably practicable along the strategic road network and using designated routes for access, as shown in Map TR-03-007 (Volume 5, Traffic and Transport Map Book).

- 7.4.53 The draft CoCP (see Volume 5: Appendix CT-003-000) includes measures that seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

- 7.4.54 Where reasonably practicable, the number of private car trips to and from the site (both work force and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan² that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where reasonably practicable, in the rural context, this will encourage the use of sustainable modes of transport or vehicle sharing.
- 7.4.55 The reductions in traffic generation arising from the travel plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.
- 7.4.56 The measures in the draft CoCP (Section 14.2) include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during the construction of the project on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.
- 7.4.57 Core site operating hours will be 08:00 to 18:00 on weekdays and 08:00 to 13:00 on Saturdays. Therefore site staff and workers will generally arrive before the morning peak hour and depart after the evening peak hour (although assessment has assumed that some work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5).
- 7.4.58 Rail replacement services will be provided when rail possessions are in place on the Marylebone to Aylesbury Line and the Chilton Main Line, where appropriate. Where practicable rail possessions will be scheduled to coincide with other planned rail possessions for engineering and maintenance works on the same line to minimise additional disruption to rail users.

² Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective

The Chalfonts and Amersham (CFA8) construction impacts

Key construction transport issues

- 7.4.59 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.
- construction vehicle movements to and from the construction site compounds;
 - temporary road closures and associated diversions of motorised users;
 - temporary PRoW closures and associated diversions of non-motorised users; and
 - short-term possessions of the Marylebone to Aylesbury Line.
- 7.4.60 No substantial traffic and transport impacts are expected on waterways and canals, public transport interchanges, parking and loading, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Highway network

- 7.4.61 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.

Strategic road network

- 7.4.62 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs) will change by 10% or more, are shown in Table 7-30 and Table 7-31 for AM peak and PM peak flows respectively.

Table 7-30: The Chalfonts and Amersham strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
A413 Amersham Road, between B416 Kingsway and A40 Oxford Road (Gerrards Cross)	NB	764	837	863	18	27	2	3%	10%
	SB	795	871	873	73	2	2	0%	2%
A413 Amersham Road, between High Street/Pheasant Hill and A404 Stanley Hill (Chalfont St.Giles)	NB	784	855	900	21	44	8	5%	58%
	SB	442	483	492	21	9	8	2%	61%
A355 Gore Hill/Amersham Rd, between A413 Amersham Bypass and Leadborough Lane (Beaconsfield)	NB	840	917	961	22	44	8	5%	64%
	SB	936	1022	1033	16	12	8	1%	119%
A413 Amersham Bypass, between A355 Gore Hill and A404 Whielden Lane (Amersham)	EB	1396	1539	1556	101	17	14	1%	15%
	WB	876	965	1040	102	75	14	8%	15%
A404 Whielden Lane, between A413 Amersham Bypass and Whielden Street (Amersham)	EB	874	964	1026	55	62	5	6%	11%
	WB	733	808	813	11	5	5	1%	97%
A413 Amersham Road, between A404 Whielden Lane and Hyde Lane (Little Missenden)	EB	1135	1237	1264	43	27	13	2%	44%
	WB	659	718	839	26	121	13	17%	102%

Table 7-31: The Chalfonts and Amersham strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
A413 Amersham Road, between B416 Kingsway and A40 Oxford Road (Gerrards Cross)	NB	975	1066	1068	11	1	1	0%	12%
	SB	214	234	259	35	25	1	11%	4%
A413 Amersham Road, between High Street/Pheasant Hill and A404 Stanley Hill (Chalfont St.Giles)	NB	755	823	831	9	8	7	1%	339%
	SB	282	308	349	8	41	7	13%	868%
A355 Gore Hill/Amersham Rd, between A413 Amersham Bypass and Leadborough Lane (Beaconsfield)	NB	939	1024	1028	9	4	3	0%	43%
	SB	699	762	797	5	35	3	5%	112%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A413 Amersham Bypass, between A355 Gore Hill and A404 Whielden Lane (Amersham)	EB	1529	958	1022	45	65	8	7%	23%
	WB	2397	1686	1696	77	10	8	1%	12%
A404 Whielden Lane, between A413 Amersham Bypass and Whielden Street (Amersham)	EB	915	664	669	28	5	5	1%	24%
	WB	1517	1009	1068	10	59	5	6%	101%
A413 Amersham Road, between A404 Whielden Lane and Hyde Lane (Little Missenden)	EB	1195	643	752	18	109	8	17%	82%
	WB	1786	1301	1321	30	20	8	2%	38%

Local road network

- 7.4.63 During the construction period there will also be a number of roads within the local network that will be affected by the proposed highway works including:
- Bottom House Farm Lane – temporary road closure and traffic diversion of motorised users, with access only for residents and diversion for all other traffic, to allow widening of Bottom House Farm Lane.
- 7.4.64 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, traffic flows (all vehicles or HGVs) will change by 10% or more, are shown in Table 7-32 and Table 7-33 for AM peak and PM peak flows respectively.

Table 7-32: The Chalfonts and Amersham local road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2021 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Joiners Lane, between Denham Lane and A413 Gravel Hill (Chalfont St Peter)	EB	250	274	276	2	2	1	1%	117%
	WB	409	448	450	3	2	1	1%	59%
Chesham Lane/Denham Lane, between Joiners Lane and Chalfont St Peter vent shaft satellite	NB	120	132	150	3	18	1	13%	81%
	SB	174	190	208	1	18	1	9%	527%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2021 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
compound (Chalfont St Peter)									
Bottom House Farm Lane, between Chalfont St Giles vent shaft satellite compound and A413 Amersham Road (Chalfont St Giles)	EB	2	2	35	8	32	8	1407%	0%
	WB	2	2	34	8	32	8	1738%	1780%
High Street/Pheasant Hill (Chalfont St Giles)	NB	412	450	452	3	2	0	1%	0%
	SB	553	605	606	4	2	0	0%	12%
Silver Hill (Chalfont St Giles)	EB	66	72	75	1	2	0	3%	0%
	WB	101	111	113	1	2	0	2%	400%
Bottrells Lane, between Silver Hill and Bottom House Farm Lane (Chalfont St Giles)	EB	15	16	19	0	2	0	14%	0%
	WB	42	46	48	0	2	0	4%	0%

Table 7-33: The Chalfonts and Amersham local road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2021 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Joiners Lane, between Denham Lane and A413 Gravel Hill (Chalfont St Peter)	EB	275	301	302	1	1	0	0%	117%
	WB	168	184	185	1	1	0	0%	117%
Chesham Lane/Denham Lane, between Joiners Lane and Chalfont St Peter vent shaft satellite compound (Chalfont St Peter)	NB	139	152	168	1	15	0	10%	176%
	SB	72	79	94	1	15	0	19%	50%
Bottom House Farm Lane, between Chalfont St Giles vent shaft satellite compound and A413 Amersham Road (Chalfont St Giles)	EB	2	3	27	3	25	3	947%	0%
	WB	1	2	26	3	25	3	1624%	0%
High Street/Pheasant Hill (Chalfont St Giles)	NB	408	446	449	6	3	0	1%	0%
	SB	380	415	416	1	2	0	0%	0%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Silver Hill (Chalfont St Giles)	EB	96	105	107	0	3	0	3%	0%
	WB	59	65	66	0	2	0	2%	0%
Bottrells Lane, between Silver Hill and Bottom House Farm Lane (Chalfont St Giles)	EB	13	14	17	0	3	0	19%	0%
	WB	13	14	15	0	2	0	11%	0%

- 7.4.65 Roads on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users (although in addition may also have an increase in other traffic generated by the construction of the Proposed Scheme) are:
- Bottrells Lane (between Bottom House Farm Lane and Silver Hill), Silver Hill, High Street, Pheasant Hill and A413 Amersham Road (between Pheasant Hill and Bottom House Farm Lane), for approximately 3 to 6 months from May 2018.
- 7.4.66 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- A413, across the whole of the study area.
- 7.4.67 The HGVs used for the transportation of construction materials and equipment, along with workforce traffic, will use designated lorry routes as described in Section 7.4.39. These roads may also have an increase in other Proposed Scheme traffic.
- 7.4.68 The implementation of the draft CoCP (see Volume 5: Annex CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.
- 7.4.69 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.

- 7.4.70 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are below. Both of these junctions are non-priority junctions.
- A413 with School Lane (Amersham Old Town) and Shardeloes; and
 - A413 Amersham Bypass with A404 Whielden Lane.
- 7.4.71 A qualitative assessment has been carried out for the non-priority junctions above as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows(including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.
- 7.4.72 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at these junctions during peak periods.

Accidents and safety

- 7.4.73 The proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Rail

- 7.4.74 The Marylebone to Aylesbury Line is a 63km railway line between London and Aylesbury, operated by Chiltern Railways. A frequent service is provided with two to four passenger trains during peak hours and two per hour at other times during the day. Services run seven days a week.
- 7.4.75 The Chiltern Main Line is an inter-urban, regional and commuter railway, connecting London and Birmingham, operated by Chiltern Railways. A frequent service is provided with two passenger trains during peak hours from Marylebone to High Wycombe, two semi-fast trains per hour from Marylebone to Princes Risborough (one) and Bicester North (one) and two fast trains per hour from Marylebone to Birmingham Moor Street. Services run seven days a week.

- 7.4.76 Within the study area the Marylebone to Aylesbury Line serves Chorleywood, Little Chalfont and Amersham stations and the Chiltern Main Line serves Gerrards Cross, Seer Green, Beaconsfield and High Wycombe stations.
- 7.4.77 The construction of the Proposed Scheme will not require temporary rail possessions in this area. However, there will be rail possessions further north on the Marylebone to Aylesbury Line and to the south on the Chilton Main Line which will affect some users of passenger services stopping at stations in this area. The possessions will be short-term and generally take place during mid-week nights or at weekends. Therefore the impacts of these possessions on rail users in this area will not be substantial.

Pedestrians, cyclists and equestrians

- 7.4.78 The review of PRoW links indicates there will be additional walking distances on two routes due to temporary diversions. Neither of these links will require a diversion of more than 500m. Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-023b to CT-05-030a (Volume 2, Map Book 8).
- 7.4.79 Table 7-34 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.4.80 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-023b to CT-05-030a (Volume 2, Map Book 8).

Table 7-34: The Chalfonts and Amersham summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
CSG/32/1 (public footpath)	Chalfont St Peter	34+200	Construction of Chalfont St Peter vent shaft	Temporary diversion south of shaft construction site boundary during construction	17	100m	1min
CSP/10/1 (public footpath)	Chalfont St Peter	34+200	Construction of Chalfont St Peter vent shaft	Temporary diversion south of shaft construction site boundary during construction	No data available	100m	1min

The Chalfonts and Amersham (CFA8) Proposed Scheme operation description

Operation trip assumptions

- 7.4.81 It is forecast that there will be no substantial changes in demand on existing transport infrastructure within the study area due to the Proposed Scheme in 2026 and 2041.

Avoidance and mitigation measures

- 7.4.82 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining all roads crossing the Proposed Scheme in their current location, or very close to their current location resulting in no diversions of traffic onto alternative routes; and
 - retaining all PRoW crossing the Proposed Scheme, with localised realignments kept to a minimum.
- 7.4.83 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

The Chalfonts and Amersham (CFA8) operation impacts

- 7.4.84 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.
- 7.4.85 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.

Key operation transport issues

- 7.4.86 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.
- 7.4.87 Permanent realignment or closure of PRoW and associated diversions to non-motorised users.
- 7.4.88 No substantial traffic and transport impacts are expected on the highway network, waterways and canals, rail services, public transport interchanges, public transport, parking and loading, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road traffic flows

- 7.4.89 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.
- 7.4.90 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.
- 7.4.91 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows with the Proposed Scheme are expected to remain the same as the 2026 and 2041 future baseline traffic flows. Therefore, no traffic impact assessment of operation of the Proposed Scheme is necessary in this study area.

Accidents and safety

- 7.4.92 There will be no impact on highway accidents and safety risk in the study area as there are no increases in traffic due to operation of the Proposed Scheme.

Pedestrians, cyclists and equestrians

- 7.4.93 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.
- 7.4.94 The review of PRoW links indicates that there will be additional walking distance, of 70m, on one link due to a permanent realignment.
- 7.4.95 Table 7-35 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.4.96 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-023b to CT-06-030a (Volume 2, Map Book 7).

Table 7-35: The Chalfonts and Amersham summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
CSP/16/1 (public footpath)	Horn Hill	31+650	Permanent diversion west from the existing alignment to Shire Lane	No available data	70m	2min

7.4.97 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

7.5 Central Chilterns (CFA9)

Central Chilterns (CFA9) Proposed Scheme description

- 7.5.1 Within this study area the Proposed Scheme will enter the area in tunnel underneath the A413 junction with Mop End Lane, heading north-west. The route will then run in cutting to Leather Lane, to the west of Ballinger Common, where the route will leave this area.
- 7.5.2 The route of the Proposed Scheme through the study area passes through predominantly rural land, consisting of mixed agricultural land, woodland and villages. The Proposed Scheme in this area lies entirely in the Chilterns Area of Outstanding Natural Beauty (AONB). The town of Chesham lies to the north-east of the Proposed Scheme and the town of High Wycombe lies to the south-west. Villages within the area include Little Missenden, Great Missenden, Little Kingshill, Hyde Heath and South Heath.
- 7.5.3 The Central Chilterns study area includes the A413/A413 London Road, B485 Chesham Road and local roads that are affected by the Proposed Scheme. The Proposed Scheme, some of which is in twin- bored tunnel in this area, crosses or goes under seven roads within the study area.
- 7.5.4 The Marylebone to Aylesbury Line runs south to north to the west of the Proposed Scheme and there is a passenger rail station at Great Missenden. The twin-bored tunnel section of the Proposed Scheme crosses under the Marylebone to Aylesbury Line west of Little Missenden.
- 7.5.5 PRoW within the area include the South Buckinghamshire Way and Chiltern Way. Cycleways include the Chilterns Cycleway. The Proposed Scheme crosses these PRoW at Hyde Heath. The Proposed Scheme, some of which is within twin-bored tunnel in this area, crosses or goes under 13 PRoW (excluding roads).
- 7.5.6 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.5.7 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2, (CFA Report 21).

- 7.5.8 The Proposed Scheme will enter this area in two deep bored tunnels at the junction of the A413 with Mop End Lane. The tunnel will run in a north-westerly direction, before emerging from the Chiltern tunnel north portal. The route will run in two bored tunnels and there will be a permanent diversion of footpath LMI/17 to the east around the tunnel portal.
- 7.5.9 The Little Missenden vent shaft, which is required to provide pressure relief from the tunnels and a dedicated intervention point and access for emergency services, will be located south of Keeper's Lane. There will be a short access road connecting the vent shaft compound to the A413.
- 7.5.10 The Proposed Scheme will emerge from the Chiltern tunnel north portal at Mantle's Wood, north-west of Hyde Heath and will continue north-west in a cutting and then on an embankment. It will then continue in a cutting up to B485 Chesham Road, south-west of South Heath. Key features of this section will include the Chiltern tunnel north portal connected to Hyde Heath Road by means of an access road. There will be a footpath GMI/27 accommodation overbridge, to maintain footpath connectivity and access for Hyde Farm. The overbridge will also provide access to land drainage areas from Hyde Lane over the Proposed Scheme. South Heath green tunnel
- 7.5.11 The Proposed Scheme will enter South Heath green tunnel adjacent to B485 Chesham Road and will continue north-west, emerging north-west of South Heath and east of Great Missenden. Key features of this section include the South Heath green tunnel south portal which will be located south of B485 Chesham Road. There will be an access road connecting the tunnel portal to B485 Chesham Road. There will be a realignment of B485 Chesham Road over the South Heath green tunnel, with a new roundabout junction with King's Lane and a realignment of the southern end of King's Lane east of South Heath green tunnel to tie into the new roundabout junction with B485 Chesham Road. A new road to provide access to either side of South Heath green tunnel for Bury Farm and a short access road connecting South Heath green tunnel north portal to Frith Hill.

South Heath cutting

- 7.5.12 The Proposed Scheme will emerge from South Heath green tunnel north portal, north of Frith Hill and will continue north-west in a cutting, north to Leather Lane (which will continue through to the Dunsmore, Wendover, and Halton area). Key features of this section include an overbridge at existing ground level, providing connectivity for footpath GMI/12 and footpath GMI/13 across the Proposed Scheme and another overbridge providing an offline replacement of footpath GMI/2 and access for Hammondshall Farm.

Leather Lane overbridge

- 7.5.13 The Proposed Scheme will continue north-west in the South Heath cutting past Leather Lane overbridge where it will leave this area. Key features of this section will include Leather Lane overbridge providing an offline replacement of Leather Lane.

Central Chilterns (CFA9) assessment methodology

- 7.5.14 The assessment methodology used is described in Section 5 and Section 7.2 of this Transport Assessment report. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday. Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The factors have been derived for the individual road types and relevant wards.
- 7.5.15 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading. As a consequence, local transport impacts may be over-estimated.
- 7.5.16 The link capacities of roads within the study area have been analysed to identify any that are likely to experience traffic congestion in the future baseline, without the Proposed Scheme. Operation of the Proposed Scheme will not result in any additional traffic on roads within this study area. Therefore, link capacities have only been assessed for those roads affected by the Proposed Scheme during construction.

7.5.17 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021 baseline have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the this threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Central Chilterns (CFA9) future baseline

Key future baseline issues

- 7.5.18 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 8-9%;
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 15-17%; and
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 30-34%.

7.5.19 As a result of this analysis, no roads subject to assessment within the study area are expected to experience substantial congestion and delay in the 2021 future baseline situation, without Proposed Scheme traffic.

Land use assumptions

- 7.5.20 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional localised traffic growth not accounted for by the growth factors previously described.
- 7.5.21 Within the study area, there are no committed developments which are considered to require adjustment to the SPD quantums within TEMPRO, which already account for future development in the study area.
- 7.5.22 The TEMPRO growth factors used in the study area are shown in Table 7-36.

Table 7-36: Central Chilterns summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	8%	15%	30%
Maximum	9%	17%	34%
Average	9%	16%	33%

Transport growth assumptions

- 7.5.23 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.
- 7.5.24 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.

Strategic and local road network traffic flows

- 7.5.25 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are the A413 Amersham Road/Missenden Bypass, B485 Chesham Road, King's Lane, Frith Hill, Hyde Heath Road, Hyde Lane, Potter Row and Leather Lane.
- 7.5.26 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B(iii).
- 7.5.27 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.5.28 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area , are presented in Table 7-37 and Table 7-38 for AM peak and PM peak flows respectively.

- 7.5.29 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area are shown in Table 7-39 and Table 7-40 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.5.30 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-37: Central Chilterns strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A413 Amersham Road (Little Missenden)	EB	1135	27	1237	30	1317	31	1520	36	102	182	385	9%	16%	34%
	WB	659	12	718	13	765	14	883	16	59	106	224	9%	16%	34%
A413 Missenden Bypass (South of B485) (Great Missenden)	NB	745	25	812	27	864	29	998	33	67	119	253	9%	16%	34%
	SB	1293	52	1409	57	1500	60	1732	70	116	207	439	9%	16%	34%
A413 Missenden Bypass (North of B485) (Great Missenden)	NB	661	19	720	21	767	22	885	25	59	106	224	9%	16%	34%
	SB	1105	45	1204	49	1282	52	1480	60	99	177	375	9%	16%	34%
B485 Chesham Road (east of King's Lane, South Heath)	EB	599	4	654	4	696	5	802	5	55	97	203	9%	16%	34%
	WB	386	5	421	5	448	5	517	6	35	62	131	9%	16%	34%
B485 Chesham Road/Frith Hill (west of King's Lane, South Heath)	EB	521	12	568	13	605	14	698	16	47	84	177	9%	16%	34%
	WB	393	27	428	29	456	31	526	36	35	63	133	9%	16%	34%

Table 7-38: Central Chilterns strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A413 Amersham Road (Little Missenden)	EB	591	9	643	10	687	11	797	12	52	96	206	9%	16%	35%
	WB	1195	20	1301	22	1388	23	1612	27	106	193	417	9%	16%	35%
A413 Missenden Bypass (South of B485, Great Missenden)	NB	1002	15	1091	16	1164	17	1352	20	89	162	350	9%	16%	35%
	SB	712	5	775	5	827	6	961	7	63	115	249	9%	16%	35%
A413 Missenden Bypass (North of B485, Great Missenden)	NB	1039	16	1131	17	1207	19	1402	22	92	168	363	9%	16%	35%
	SB	648	4	706	4	753	5	875	5	58	105	227	9%	16%	35%
B485 Chesham Road (east of King's Lane, South Heath)	EB	359	1	391	1	417	2	484	2	32	58	125	9%	16%	35%
	WB	508	1	554	2	591	2	685	2	46	83	177	9%	16%	35%
B485 Chesham Road/Frith Hill (west of King's Lane, South Heath)	EB	367	4	400	4	426	5	495	5	33	59	128	9%	16%	35%
	WB	503	4	548	4	584	5	679	5	45	81	176	9%	16%	35%

Table 7-39: Central Chilterns local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Hyde Lane (South Heath)	NB	6	0	7	0	7	0	8	0	1	1	2	9%	16%	34%
	SB	9	0	9	0	10	0	11	0	0	1	2	9%	16%	34%
King's Lane (south of Frith Hill, South Heath)	NB	40	0	44	0	46	1	53	1	4	6	13	9%	16%	34%
	SB	98	1	107	1	114	1	131	1	9	16	33	9%	16%	34%
Frith Hill (South Heath)	EB	71	0	78	0	83	0	95	0	7	12	24	9%	16%	34%
	WB	134	0	147	0	156	0	180	0	13	22	46	9%	16%	34%
Hyde Heath Road (South Heath)	NB	106	0	116	0	123	0	142	0	10	17	36	9%	16%	34%
	SB	223	2	243	2	258	2	298	2	20	35	75	9%	16%	34%
Potter Row (South Heath)	EB	40	1	44	1	46	1	53	1	4	6	13	9%	16%	34%
	WB	31	1	34	1	36	1	41	1	3	5	10	9%	16%	34%
Leather Lane (South Heath)	EB	27	0	29	0	31	0	36	0	2	4	9	9%	16%	34%
	WB	34	0	38	0	40	0	46	0	4	6	12	9%	16%	34%

Table 7-40: Central Chilterns local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Hyde Lane (South Heath)	NB	5	0	5	0	5	0	6	0	0	0	1	9%	17%	35%
	SB	6	0	6	0	7	0	8	0	0	1	2	9%	17%	35%
King's Lane (south of Frith Hill, South Heath)	NB	66	0	72	0	77	0	89	0	6	11	23	9%	16%	35%
	SB	32	0	35	0	38	0	44	0	3	6	12	9%	16%	35%
Frith Hill (South Heath)	EB	101	0	110	0	117	0	136	0	9	16	35	9%	16%	35%
	WB	64	0	70	0	75	0	87	0	6	11	23	9%	16%	35%
Hyde Heath Road (South Heath)	NB	147	0	160	0	171	0	198	0	13	24	51	9%	16%	35%
	SB	108	0	118	1	126	1	146	1	10	18	38	9%	16%	35%
Potter Row (South Heath)	EB	20	0	22	0	24	0	27	0	2	4	7	9%	16%	35%
	WB	33	0	35	0	38	0	44	0	2	5	11	9%	16%	35%
Leather Lane (South Heath)	EB	24	0	26	0	28	0	32	0	2	4	8	9%	17%	35%
	WB	15	0	17	0	18	0	21	0	2	3	6	9%	17%	35%

Central Chilterns (CFAg) Proposed Scheme construction description

Construction activities

7.5.31 The major construction elements within the study area are as follows:

- Chiltern tunnel;
- Little Missenden vent shaft and auto-transformer station;
- Chiltern tunnel north portal and Chiltern tunnel north cutting ;
- South Heath green tunnel;
- South Heath cutting; and
- Leather Lane overbridge

7.5.32 Details of the construction phasing are provided in Section 2 and the main construction works and the time periods when each compound is operational are summarised below in Figure 7-4.

Figure 7-4: Central Chilterns construction activity phasing

Construction activity	2017	2018	2019	2020	2021	2022	2023	2024	2025											
	quarters																			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Advance works																				
Advance works																				
Civil engineering works																				
Chiltern Tunnel Main Compound (210/08)																				
Little Missenden vent shaft Satellite Compound (230/01)																				
Chiltern Tunnel North Portal Satellite Compound (230/02)																				
South Heath Green Tunnel (South) Satellite																				
South Heath Green Tunnel (North) Satellite																				
Leather Lane Overbridge Satellite Compound (230/05)																				
Rail infrastructure and systems works																				
High speed railway installation (From West Ruislip railhead main compound) (0150/04)																				
High speed railway installation (From Calvert railhead main compound) (013/104)																				
Chilterns main compound (Rail Systems) (0230/03)																				
Little Missenden vent shaft satellite compound (0230/01)																				
Chiltern Tunnel North portal satellite compound (009/102)																				
South Heath Green Tunnel North portal satellite compound (009/104)																				
Commissioning (until end 2026)																				

Compounds and construction sites

- 7.5.33 Main site compounds would be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds would generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.5.34 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-41. There are no compounds within the study area with shift working (24 hours).
- 7.5.35 The locations of compounds are shown on Maps CT-05-03ob to CT-05-034a (Volume 2, Map Book 9).

Table 7-41: Central Chilterns assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of the construction programme	
		Average	Peak
Satellite	Little Missenden vent shaft	32	62
Satellite	Chiltern tunnel north portal (civil engineering)	15	54
Satellite	Chiltern tunnel north portal (railway systems)	16	18
Satellite	South Heath green tunnel (south)	110	134
Main	Chilterns (rail systems)	32	37
Satellite	South Heath green tunnel (north)	14	41
Satellite	South Heath tunnel north portal (rail systems)	23	43

Construction trip assumptions

Trip generation

- 7.5.36 The duration of when there will be busy transport activity at each site is shown in Table 7-42. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-42: Central Chilterns typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Satellite	Little Missenden vent shaft	A413	2018	Six years and three months	Ten months	80-90	50-60
Satellite	Chiltern tunnel north portal (civil engineering)	Upgraded access track to Mantle's Wood via Hyde Heath Road, B485 Chesham Road, Frith Hill and A413	2017	Four years and nine months	Nine Months	90-110	30-40
Satellite	Chiltern tunnel north portal (railway systems)	Chesham Road via A413	2023	Two years			
Satellite	South Heath green tunnel (south)		2017	Seven years and nine months	Three years and five months	150-190	50-60
Main	Chilterns (rail systems)						

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Satellite	South Heath green tunnel (north)	B485 Chesham Road and A413	2017	Three years and nine months	One year and one months	70-100	20-50
Satellite	South Heath tunnel north portal (rail systems)		2023	One year and three months			

7-5.37 Information on the indicative construction programme is provided in Figure 7-4, which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-42. Consequently the peak traffic movements presented will not generally occur at the same time, although in some instances there may be some overlap.

7-5.38 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment

7-5.39 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;
- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been

assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network; and

- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

7.5.40 Within the study area, mass-haul movements have been assigned to the A413 across the whole of the area.

7.5.41 Within the study area, construction traffic has been assigned to the roads listed in the construction lorry routes section below. Workforce traffic has been assigned to the same roads and additionally, Leather Lane.

7.5.42 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.

7.5.43 From the neighbouring areas to the north, including Dunsmore, Wendover and Halton (CFA10) and to a lesser extent the Stoke Mandeville and Aylesbury (CFA11) areas, the cumulative average construction traffic flows of approximately 310 cars/LGVs per day (two-way) and 60 HGVs per day (two way) have been included in the assessment for this area. These flows have been assigned to the A413.

7.5.44 From the neighbouring areas to the south, including The Chalfonts and Amersham (CFA8) area, the cumulative average construction traffic flows of approximately 20 cars/LGVs per day (two way) have been included in the assessment for this area. Any HGV traffic generated to the south will not directly access roads assessed within this area. These car/LGV flows have been assigned to the A413.

Construction lorry routes

7.5.45 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Map TR-03-053 (Volume 5, Map Book 71):

- Little Missenden vent shaft satellite compound will be accessed via A413;
- Chiltern tunnel north portal (civil engineering) and Chiltern tunnel north portal (railway systems) satellite compounds will be accessed via upgraded access track to Mantle's Wood via Hyde Heath Road, B485 Chesham Road/Frith Hill and A413;
- South Heath green tunnel (south) satellite compound and Chilterns (rail systems) main compound will be accessed via B485 Chesham Road /Frith hill and A413; and
- South Heath green tunnel (north) and South Heath tunnel north portal (rail systems) satellite compounds will be accessed via Frith Hill, B485 Frith Hill and A413.

Traffic management, road closures and diversions

- 7.5.46 The roads in the study area that will be subject to temporary closure during construction of the Proposed Scheme are summarised in Table 7-43.
- 7.5.47 The approximate length of diversions listed is the 'worst case' scenario based on the maximum distance from one side of the road closure to the other. In reality, a proportion of vehicles diverted will be subject to a diversion distance less than what is reported.

Table 7-43: Central Chilterns temporary road closures and diversions

Name	Location	Location (chainage)	Diversion route	Approximate length of diversions	Programme	Duration
Hyde Lane (south of South Heath)	South Heath	045+780	A413 and B485 Chesham Road	Up to 6km	Oct 2017	Up to one year
Frith Hill	South Heath	047+100	B485 Chesham Road and Kings Lane	Up to 2.6km	Dec 2017	Up to two years

- 7.5.48 The temporary diversions will affect approximately 120 vehicles a day (12 hour 2021 base flow) on Hyde Lane and approximately 1,930 vehicles a day on Frith Hill.
- 7.5.49 The following roads are to be realigned; however construction of the new roads will be carried out 'off-line', meaning that the existing roads will remain open with no diversion of traffic required until the new off-line sections of road are complete. Traffic management and/or very short term closures i.e. overnight, off-peak or weekend, may be required to tie the new off-line sections of road into existing roads immediately before switchover, although these are not considered to have a substantial impact upon motorised users.
- B485 Chesham Road;
 - Kings Lane; and
 - Leather Lane.

PRoW closures and diversions

- 7.5.50 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-44.
- 7.5.51 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.
- 7.5.52 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-03ob to CT-05-034a (Volume 2, Map Book 9).

Table 7-44: Central Chilterns temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
LMI/17/2 (public footpath)	Hyde Heath	044+700	June 2018	1500m Up to one year	Construction of Chiltern Tunnel North Portal Temporary diversion to LMI/17/1, LMI/28/1, Chalk Lane, LMI/27/1, Bullbaiters Lane & Hyde Heath Road.
GMI/23/6	Hyde Heath	045+150	May 2019	100m Up to nine months	To avoid temporary stockpile Temporary diversion along the landscape embankment and connecting to Footpath GMI/27 accommodation overbridge.
GMI/27/1 (public footpath)	Hyde Heath	045+500	Oct 2018	400m Up to nine months	Construction of Footpath GMI/27 accommodation overbridge Temporary diversion via Hyde Lane.
Hyde Lane	Hyde Heath	045+700	Oct 2017	900m Up to one year	Construction of Hyde Lane overbridge. Temporary closure of existing facilities. Temporary diversion from B485 Chesham Road to GMI/33/2 and GMI/33/3 (public footpath).
GMI/33/2	South Heath	045+100	May 2019	750m Up to six months	Landscape mitigation planting and landscape earthworks Temporary diversion along Chesham Road and Hyde Lane
GMI/33/4 (public footpath)	South Heath	046+100	May 2019	100m Up to six months	Construction of Chiltern Tunnel cutting and South Heath Green Tunnel Portal Possible temporary diversion during construction of access track.
GMI/33/5 (public footpath)	South Heath	46+400	May 2019	250m Up to two years	To divert around the temporary stockpiles Temporary diversion to the south of the site boundary and Hyde Lane.
GMI/79/2	South Heath	046+700	Dec 2017	400m Up to two years	Construction of South Heath green tunnel Temporary closure of PRoW within green tunnel works area. Temporary diversion from Chesham Road to the realigned Kings Lane and Chesham Road.
GMI/79/1	South Heath	046+700	Dec 2017	400m Up to two years	Construction of South Heath Green Tunnel Temporary closure of PRoW within green tunnel works area. Temporary diversion from Chesham Road to the realigned Kings Lane and Chesham Road.
GMI/28/2	South Heath	046+700	Dec 2017	400m Up to two years	Construction of South Heath green tunnel Temporary closure of PRoW within green

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
					tunnel works area. Temporary diversion from Chesham Road to the realigned Kings Lane and Chesham Road.
GMI/28/1 (public footpath)	South Heath	046+700	Dec 2017	400m Up to two years	Construction of South Heath green tunnel Temporary closure of PRoW within green tunnel works area. Temporary diversion from Chesham Road to the realigned Kings Lane and Chesham Road.
GMI/80/1 (public footpath)	South Heath	046+700	Dec 2017	300m Up to two years	Construction of South Heath green tunnel Temporary closure of PRoW within green tunnel works area. Temporary diversion from Kings Lane/Chesham Road via GMI/81/1 and Sibleys Rise.
Frith Hill	South Heath	47+100	Dec 2017	400m Up to two years	Construction of South Heath green tunnel Temporary diversion to the east of the newly constructed green tunnel (subject to construction phasing).
GMI/12/1 (public footpath)	South Heath	047+800	Jan 2018	100m Up to nine months	Construction of Footpath GMI/12 overbridge Temporary diversion along the boundary of construction works

7.5.53 The following PRoW will be temporarily diverted by a negligible distance during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:

- LMI/21/1 (public footpath)
- GMI/33/3 (public footpath)
- GMI/13/3 (public footpath)
- Leather Lane
- GMI/2/1 (public footpath); and
- Footpath GMI/2 accommodation overbridge.

7.5.54 All other PRoW remain open during the construction of Proposed Scheme and are not considered to be substantially impacted by the works.

7.5.55 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:

- LMI/21/1 (public footpath);

- GMI/23/7 (public footpath);
- GMI/27/1 (public footpath);
- B485 Chesham Road;
- GMI/33/3 (public footpath);
- GMI/33/2;
- GMI/33/4 (public footpath);
- King's Lane;
- GMI/13/3 (public footpath); and
- GMI/2/1 (public footpath).

Utilities works

7.5.56 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area.

7.5.57 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Road within the study area which will be affected by utility works are:

- A413;
- B485 Chesham Road; and
- Ballinger Road.

Avoidance and mitigation measures

7.5.58 The following measures have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce impacts on transport users:

- transporting construction materials and equipment along haul roads within and adjacent to the route of Proposed Scheme alignment, where reasonably practicable, to reduce lorry movements on the public highway;
- the majority of roads crossing the Proposed Scheme will be kept open during

construction reducing diversions of traffic onto alternative routes;

- provision of temporary alternative routes and/or building structures early to maintain connectivity for PRoW closed during construction to reduce loss of amenity;
- HGV routeing as far as reasonably practicable along the strategic road network, and using designated access roads, as shown in Map TR-03-053 (Volume 5, Map Book, Traffic and Transport);
- Excavated material will be reused where practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles movements on the public highway; and
- reducing daily travel of site workers by providing welfare facilities.

7.5.59 The draft CoCP (see Volume 5: Appendix CT-003-000/1) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.5.60 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported through an overarching framework travel plan³ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where reasonably practicable within a rural context, this will encourage the use of sustainable modes of transport or vehicle sharing.

7.5.61 The reductions in traffic generation arising from the Travel Plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.

7.5.62 The measures in the draft CoCP include clear controls on vehicle types, hours of site operation and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during the construction of the project on or adjacent to public roads, footpaths and other PRoW affected by the Proposed Scheme as necessary.

³ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective

- 7.5.63 Specific measures will include core site operating hours that will be 08:00 to 18:00 on weekdays and 08:00 to 13:00 on Saturdays. Site staff and workers will therefore generally arrive before the morning peak hour and depart after the evening peak hour (although assessment has assumed that some of work journeys to the construction sites take place within the morning and evening peak hours, which is a reasonable worst case scenario (draft CoCP, Section 5)).
- 7.5.64 Rail replacement services will be provided when rail possessions are in place on the Marylebone to Aylesbury Line. Where practicable rail possessions will be scheduled to coincide with other planned rail possessions for engineering and maintenance works on the same line to minimise additional disruption to rail users.

Central Chilterns (CFA9) construction impacts

Key construction transport issues

- 7.5.65 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.
- construction vehicle movements to and from the construction site compounds;
 - temporary road closures and associated diversions of motorised users;
 - temporary road closures and associated diversions of bus services;
 - temporary PRoW closures and associated diversions of non-motorised users; and
 - short-term possessions of the Marylebone to Aylesbury Line.
- 7.5.66 No substantial traffic and transport impacts are expected on waterways and canals, public transport interchanges, parking and loading, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.5.67 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.
- 7.5.68 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs) will change by 10% or more, are shown in Table 7-45 and Table 7-46 for AM peak and PM peak flows respectively.

Table 7-45: Central Chilterns strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles		All vehicles	HGV	All vehicles	HGV
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A413 Amersham Road (Little Missenden)	EB	1135	1237	1264	43	27	13	2%	44%
	WB	659	718	839	26	121	13	17%	102%
A413 Missenden Bypass (South of B485)	NB	745	812	919	40	107	13	13%	47%
	SB	1293	1409	1446	69	37	13	3%	22%
A413 Missenden Bypass (North of B485)	NB	661	720	820	33	99	13	14%	61%
	SB	1105	1204	1245	62	41	13	3%	26%
B485 Chesham Road (east of King's Lane)	EB	599	654	701	7	48	2	7%	55%
	WB	386	421	476	7	55	2	13%	49%
B485 Chesham Road/Frith Hill (west of King's Lane)	EB	521	568	689	19	121	6	21%	48%
	WB	393	428	612	36	184	6	43%	22%

Table 7-46: Central Chilterns strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles		All vehicles	HGV	All vehicles	HGV
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A413 Amersham Road (Little Missenden)	EB	591	643	752	18	109	8	17%	82%
	WB	1195	1301	1321	30	20	8	2%	38%
A413 Missenden Bypass (South of B485)	NB	1002	1091	1118	24	27	8	3%	49%
	SB	712	775	872	14	97	8	12%	148%
A413 Missenden Bypass (North of B485)	NB	1039	1131	1165	25	34	8	3%	46%
	SB	648	706	795	12	89	8	13%	185%
B485 Chesham Road (east of King's Lane)	EB	359	391	437	2	46	1	12%	57%
	WB	508	554	596	2	43	1	8%	53%
B485 Chesham Road/Frith Hill (west of King's Lane)	EB	367	400	536	7	137	2	34%	50%
	WB	503	548	654	7	107	2	19%	51%

7.5.69 During the construction period there will also be a number of roads within the local network that will be affected by the proposed highway works including:

- Hyde Lane - temporary road closure and traffic diversion, to allow construction of overbridge; and

- Frith Hill - temporary road closure and traffic diversion, to allow construction of realigned road.

7.5.70 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, traffic flows (all vehicles or HGVs) will change by 10% or more, are shown in Table 7-47 and Table 7-48 for AM peak and PM peak flows respectively.

Table 7-47: Central Chilterns local road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
King's Lane (between Frith Hill and B485 Chesham Road)	NB	40	44	208	3	164	3	377%	587%
	SB	98	107	187	3	80	3	75%	351%
Frith Hill (between Potter Row/King's Lane and B485 Frith Hill)	EB	71	78	102	6	24	6	31%	0%
	WB	134	147	170	6	24	6	16%	2787%
Hyde Heath Road	EB	106	116	140	3	24	2	21%	829%
	WB	223	243	267	4	24	2	10%	144%
Potter Row (between Frith Hill and Leather Lane)	NB	40	44	50	3	6	3	14%	469%
	SB	31	34	36	3	3	3	8%	293%
Leather Lane	EB	27	29	44	0	15	0	52%	0%
	WB	34	38	56	0	19	0	50%	0%

Table 7-48: Central Chilterns local road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
King's Lane (between Frith Hill and B485 Chesham Road)	NB	66	72	143	1	71	1	98%	907%
	SB	32	35	160	1	125	1	354%	271%
Frith Hill (between Potter Row/King's Lane and B485 Frith Hill)	EB	101	110	127	2	17	2	15%	1859%
	WB	64	70	87	2	17	2	24%	1487%
Hyde Heath Road	EB	147	160	181	1	21	1	13%	201%
	WB	108	118	139	1	21	1	18%	158%
Potter Row (between	NB	20	22	23	1	1	1	4%	0%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Frith Hill and Leather Lane)	SB	33	35	40	1	4	1	12%	782%
Leather Lane	EB	24	26	44	0	17	0	67%	0%
	WB	15	17	31	0	14	0	86%	0%

- 7.5.71 Roads on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users (although in addition may also have an increase in other traffic generated by the construction of the Proposed Scheme) are:
- A413 Missenden Bypass (between Hyde Lane and B485 Chesham Road) and B485 Chesham Road (between A413 Missenden Bypass and Hyde Lane) for up to one year from October 2017;
 - B485 Chesham Road (between Frith Hill and Kings Lane) and Kings Lane, for up to two years from December 2017.
- 7.5.72 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- The A413 across the whole of the study area.
- 7.5.73 The HGVs used for the transportation of construction materials and equipment will use designated lorry routes as described in Section 7.5.45. Workforce traffic has been assigned to the same roads and additionally Leather Lane. Some of these roads may also have an increase in other Proposed Scheme traffic.
- 7.5.74 The implementation of the draft CoCP (see Volume 5: Annex CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

Junction performance

- 7.5.75 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.

7.5.76 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:

- A413 with A4128 Link Road;
- A413 with Leather Lane;
- A413 with B485 Frith Hill and Chesham Road;
- B485 Chesham Road with Frith Hill;
- B485 Chesham Road with King's Lane;
- B485 Chesham Road with Hyde Heath Road; and
- King's Lane with Frith Hill with Potter Row.

7.5.77 Of the junctions above, A413 with Leather Lane, B485 Chesham Road with Frith Hill, B485 Chesham Road with King's Lane, B485 Chesham Road with Hyde Heath Road and King's Lane with Frith Hill and Potter Row are priority junctions. The 2021 traffic flows with Proposed Scheme traffic (in PCU) at these junctions are shown in Table 7-49 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

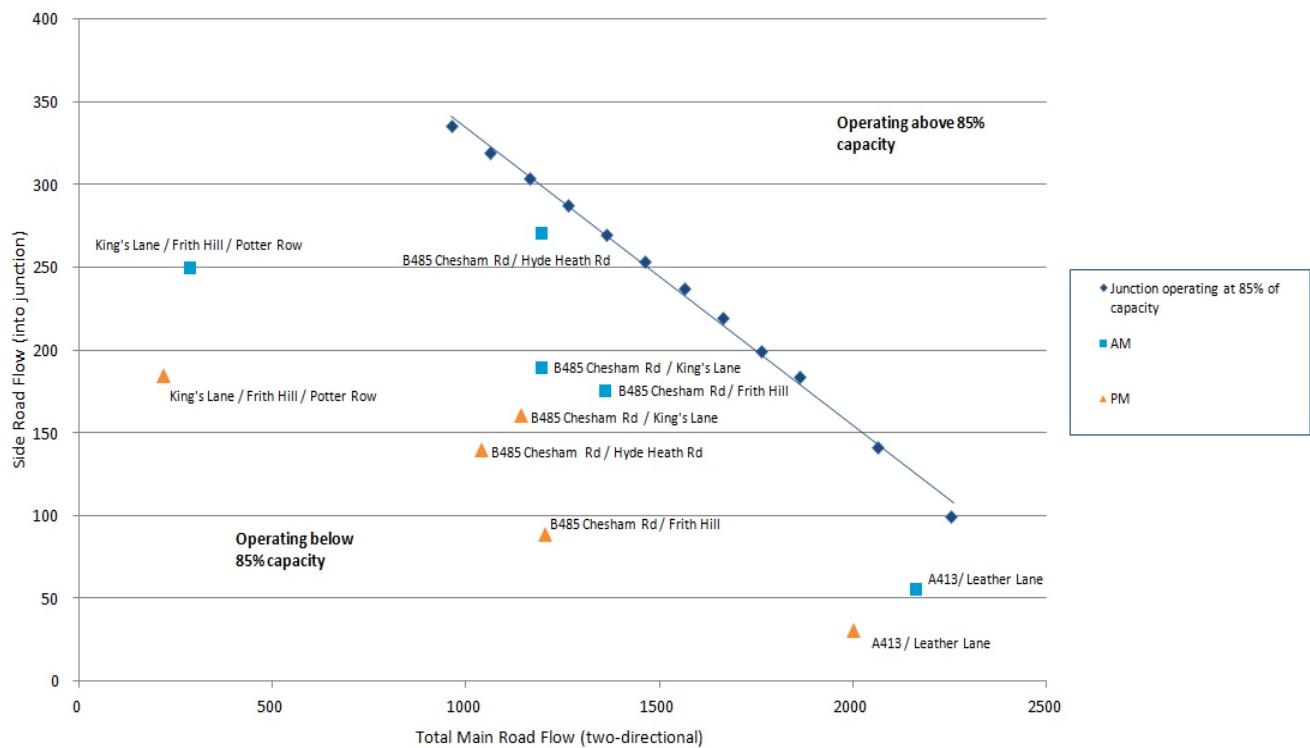
Table 7-49: Central Chilterns priority junction flows

Junction	2021 With HS2 construction traffic			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A413 /Leather Lane	2159	56	1998	31
B485 Chesham Rd/Frith Hill	1356	176	1204	89
B485 Chesham Rd/King's Lane	1192	190	1142	161
B485 Chesham Rd/Hyde Heath Rd	1192	271	1039	140
King's Lane/ Frith Hill/Potter Row	284	250	217	185

7.5.78 The priority junctions have been plotted on a graph, shown in Figure 7-5, that shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

7.5.79 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-5: Central Chilterns priority junction assessment 2021



- 7.5.80 The graph illustrates that all affected junctions in the study area fall below the 'threshold' of capacity during both AM and PM peaks and are therefore not forecast to be close to their theoretical capacity of 85% during construction of the Proposed Scheme. As a result, they are not considered to warrant individual assessment and have therefore not been assessed with junction assessment software.
- 7.5.81 The A413 with A4128 Link Road and A413 with B485 Frith Hill/Chesham Road non-priority junctions have been modelled using industry standard software for the 2021 year of assessment, with and without the Proposed Scheme. The results, shown in Table 7-50 and Table 7-51, have been presented in terms of ratio of flow to capacity and maximum queue lengths to establish the impact of Proposed Scheme traffic during construction upon junction operation.

Table 7-50: Central Chilterns comparison forecast baseline and construction scenario performance at A413/A4128 Link Road junction (priority roundabout)

0800-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/capacity %	Max queue	Flow (All PCU)	Flow/capacity %	Max queue
A413 (S) Missenden Bypass	741	36%	1	853	42%	1
A4128 Link Road	459	35%	1	528	41%	1
A413 (N) Missenden Bypass	1253	65%	2	1307	70%	3
Total	N/A	65%	N/A	N/A	70%	N/A
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A413 (S) Missenden Bypass	1148	56%	2	1190	58%	2
A4128 Link Road	417	37%	1	432	39%	1
A413 (N) Missenden Bypass	1253	63%	2	1307	66%	3
Total	N/A	63%	N/A	N/A	66%	N/A

Table 7-51: Central Chilterns comparison forecast baseline and construction scenario performance at A413/B485 Frith Hill/Chesham Road junction (priority roundabout)

0800-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/capacity %	Max queue	Flow (All PCU)	Flow/capacity %	Max queue
B485 Frith Hill	426	36%	1	648	56%	2
A413 (S) London Road	839	37%	1	959	45%	1
A413 (N) London Road	1253	50%	1	1307	53%	2
Total	N/A	50%	N/A	N/A	56%	N/A

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/capacity %	Max queue	Flow (all PCU)	Flow/capacity %	Max queue
B485 Frith Hill	556	38%	1	661	46%	1
A413 (S) London Road	1107	51%	1	1142	54%	2
A413 (N) London Road	710	28%	1	807	32%	1
Total	N/A	51%	N/A	N/A	54%	N/A

- 7.5.82 The modelling results indicate that the A413 with A4128 Link Road junction is predicted to operate within capacity during construction of the Proposed Scheme, with the highest percentage of flow to capacity predicted as 70% on the A413 (N) Missenden Bypass arm in the AM Peak. As this is well below 85%, (considered to represent theoretical capacity), the impact of the Proposed Scheme is not considered to have a substantial impact on capacity at this junction.
- 7.5.83 The modelling results indicate that the A413 with B485 Frith Hill/Chesham Road junction is predicted to operate well within capacity during construction of the Proposed Scheme, with the highest percentage of flow to capacity predicted as 56% on the B485 Frith Hill arm in the AM Peak. As this is well below 85%, (considered to represent theoretical capacity), the impact of the Proposed Scheme is not considered to have a substantial impact on capacity at this junction.

Accidents and safety

- 7.5.84 The proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Rail

- 7.5.85 The Marylebone to Aylesbury Line is a 63km railway line between London and Aylesbury, operated by Chiltern Railways. A frequent service is provided with two to four passenger trains during peak hours and two per hour at other times during the day. Services run seven days a week.
- 7.5.86 Within the study area the Marylebone to Aylesbury Line serves Great Missenden station.
- 7.5.87 The construction of the Proposed Scheme will not require temporary rail possessions in this area. However, there will be rail possessions further north on the Marylebone to Aylesbury Line which will affect some users of passenger services stopping at the station in this area. The possessions will be short-term and generally take place during mid-week nights or at weekends. Therefore the impacts of these possessions on rail users in this area will not be substantial.

Local bus and coach

- 7.5.88 The temporary closure of Frith Hill will require the diversion of a bus route onto an alternative route, as shown in Table 7-52. The approximate additional journey time from start to end of route as a result of diversions has been recorded based upon average speed of service and length of diversion.

Table 7-52: Central Chilterns temporary local bus/coach diversions

Bus/Coach service	Impact	Combined Service Frequency (potential max per hour)	Diversion route	Approximate length of diversions	Approximate additional journey time (start to end of route)
Bus service No. 77/177	Temporary closure of Frith Hill, requiring a diversion of the bus service for up to two years	One	B485 Chesham Road	800m	2min

- 7.5.89 The diversion to bus service 77/177 is not deemed to be substantial due to the relatively short diversion distance and small increase in journey time.
- 7.5.90 Other bus and coach services will not be impacted by construction of the Proposed Scheme except as a result of potential additional traffic congestion and delay at locations identified above.

Pedestrians, cyclists and equestrians

- 7.5.91 The review of PRoW links indicates there will be additional walking distances on 13 routes due to temporary diversions, with three of these links requiring a diversion of more than 500m.
- 7.5.92 Table 7-53 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.5.93 Temporary closures and diversions of PRoW during construction are shown Maps CT-05-03ob to CT-05-034a (Volume 2, Map Book 9).

Table 7-53: Central Chilterns summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
LMI/17/2 (public footpath)	Hyde Heath	044+700	Construction of Chiltern Tunnel North Portal	Temporary diversion to LMI/17/1, LMI/28/1, Chalk Lane, LMI/27/1, Bullbaiters Lane & Hyde Heath Road.	11	1.5km	18 min
GMI/23/6	Hyde Heath	045+150	To avoid temporary stockpile	Temporary diversion along the landscape embankment and connecting to Footpath GMI/27 accommodation overbridge.	No data available	100m	1 min
GMI/27/1 (public footpath)	Hyde Heath	045+500	Construction of Footpath GMI/27 accommodation overbridge	Temporary diversion via Hyde Lane.	6	400m	5 min
Hyde Lane	Hyde Heath	045+700	Construction of Hyde Lane overbridge.	Temporary closure of existing facilities. Temporary diversion from B485 Chesham Road to GMI/33/2 and GMI/33/3 (public footpath).	16	900m	11 min
GMI/33/2	South Heath	045+100	Landscape works	Temporary diversion along Chesham Road and Hyde Lane	4	750m	9min
GMI/33/4 (public footpath)	South Heath	046+100	Construction of Chiltern Tunnel cutting and South Heath Green Tunnel Portal	Possible temporary diversion during construction of access track.	0	100m	1 min
GMI/33/5 (public footpath)	South Heath	46+400	To divert around the temporary stockpiles	Temporary diversion to the south of the site boundary and Hyde Lane.	0	250m	3 min
GMI/79/2	South Heath	046+700	Construction of South Heath green tunnel	Temporary closure of PRoW within green tunnel works area. Temporary diversion from Chesham Road to the realigned Kings Lane and Chesham Road.	24	400m	5 min
GMI79/1	South Heath	046+700	Construction of South Heath Green Tunnel	Temporary closure of PRoW within green tunnel works area. Temporary diversion from Chesham	No data available		

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
				Road to the realigned Kings Lane and Chesham Road.		400m	5 min
GMI/28/2	South Heath	046+700	Construction of South Heath green tunnel	Temporary closure of PRoW within green tunnel works area. Temporary diversion from Chesham Road to the realigned Kings Lane and Chesham Road.	No data available	400m	5 min
GMI/28/1 (public footpath)	South Heath	046+700	Construction of South Heath green tunnel	Temporary closure of PRoW within green tunnel works area. Temporary diversion from Chesham Road to the realigned Kings Lane and Chesham Road.	29	400m	5 min
GMI/80/1 (public footpath)	South Heath	046+700	Construction of South Heath green tunnel	Temporary closure of PRoW within green tunnel works area. Temporary diversion from Kings Lane/Chesham Road via GMI/81/1 and Sibleys Rise.	No data available	300m	4 min
Frith Hill	South Heath	47+100	Construction of South Heath green tunnel	Temporary diversion to the east of the newly constructed green tunnel (subject to construction phasing).	51	400m	5 min

Central Chilterns (CFAg) Proposed Scheme operation description

Operation trip assumptions

7.5.94 It is forecast that there will be no substantial changes in demand on existing transport infrastructure within the study area due to the Proposed Scheme in 2026 and 2041.

Avoidance and mitigation measures

7.5.95 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:

- retaining the majority of roads crossing the Proposed Scheme in their current location, or very close to their current location resulting in no substantial diversions of traffic onto alternative routes; and
- retaining PRoW crossing the Proposed Scheme, with localised realignments kept to a minimum.

7.5.96 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Central Chilterns (CFA9) operation impacts

7.5.97 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.

7.5.98 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.

Key operation transport issues

7.5.99 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.

- Permanent realignment or closure of PRoW and associated diversions to non-motorised users.

7.5.100 No substantial traffic and transport impacts are expected on the highway network, waterways and canals, rail services, public transport interchanges, public transport, parking and loading, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

7.5.101 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.

7.5.102 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.

7.5.103 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows with the Proposed Scheme are expected to remain the same as the 2026 and 2041 future baseline traffic flows. Therefore, no traffic impact assessment of operation of the Proposed Scheme is necessary in this study area.

Accidents and safety

- 7.5.104 There will be no impact on highway accidents and safety risk in the study area as there are no increases in traffic due to operation of the Proposed Scheme.

Pedestrians, cyclists and equestrians

- 7.5.105 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.
- 7.5.106 The review of PRoW links indicates that there will be additional walking distances on 10 routes due to permanent realignments, with four of these realigned links requiring a diversion of more than 500m.
- 7.5.107 Table 7-54 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.5.108 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-030b to CT-06-034a (Volume 2, Map Book 9).

Table 7-54: Central Chilterns summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
LMI/21/1 (public footpath)	Hyde Heath	045+000	Permanent diversion along footpath LMI/17/2, verge of Hyde Heath Road, Chesham Road and GMI/23/6.	16	700m	8min
GMI/23/7 (public footpath)	Hyde Heath	045+150	Permanent diversion along footpath GMI/23/6, Chesham Road, verge of Hyde Heath Road, LMI/17/2.	3	700m	8min
GMI/27/1 (public footpath)	South Heath	045+500	Permanent diversion via Footpath GMI/27 accommodation overbridge.	6	150m	2min
B485 Chesham Road	South Heath	045+800	Permanent diversion via realigned Chesham Road.	38	150m	2min
GMI/33/3 (public footpath)	South Heath	045+900	Permanent diversion along north side of HS2, from Hyde Lane to tie-into existing footpath at Approx Ch 46+000.	4	100m	1min

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
GMI/33/2	South Heath	045+900	Permanent diversion along north side of HS2, from Hyde Lane to tie-into existing footpath at Approx Ch 46+000.	No data available	100m	1min
GMI/33/4 (public footpath)	South Heath	046+100	Permanent diversion along south side of HS2, from Hyde Lane to South Heath Green Tunnel South Portal access track.	0	400m	5min
King's Lane	South Heath	46+400	Permanent diversion to realigned Kings Lane	24	100m	1min
GMI/13/3 (public footpath)	South Heath	047+450	Permanent diversion via Footpath GMI/12 overbridge.	57	750m	9min
GMI/2/1 (public footpath)	South Heath	048+150	Permanent diversion across Public Footpath GMI/2 accommodation overbridge.	39	550m	7min

7.5.109 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

7.6 Dunsmore, Wendover & Halton (CFA10)

Dunsmore, Wendover & Halton (CFA10) Proposed Scheme description

- 7.6.2 The Proposed Scheme through this area will be approximately 8km in length. It will commence in cutting at the Leather Lane overbridge, north of Great Missenden, and will proceed north-westwards onto a viaduct to the north-east of Wendover Dean. It will pass to the east of Dunsmore on a series of embankments and cuttings, before crossing over the A413 London Road on a viaduct at Small Dean. It will then run parallel to the A413 and the Marylebone to Aylesbury Line in tunnel, emerging into a cutting just beyond the western edge of Wendover. It will leave the study area on embankment.
- 7.6.3 The area is predominantly rural in character, with agricultural land interspersed with large areas of woodland, small villages and isolated farmsteads. The Proposed Scheme will pass within 1km of the villages of Hunt's Green, King's Ash and Wendover Dean and along the south-western edge of Wendover, the largest settlement in the area.
- 7.6.4 The Dunsmore, Wendover & Halton study area includes the A413 London Road/Nash Lee Road, A4010 Risborough Road, B4009 Nash Lee Road and local roads that are affected by the Proposed Scheme. The Proposed Scheme crosses eight roads within the study area.
- 7.6.5 The Marylebone to Aylesbury Line runs south to north through the study area and intersects the Proposed Scheme just south of Wendover. There is a passenger rail station at Wendover
- 7.6.6 Significant PRoW within the study area include the South Buckinghamshire Way, the Chiltern Way, the Chiltern Link and The Ridgeway National Trail, all of which the Proposed Scheme crosses within the area. The Proposed Scheme crosses ten PRoW within the study area.
- 7.6.7 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.6.8 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2 (CFA Report 21)

- 7.6.9 The Proposed Scheme will leave the Central Chilterns area (CFA9) in the South Heath cutting, which continues into the Dunsmore, Wendover and Halton area. This section of the Proposed Scheme extends from Leather Lane, north of Great Missenden to north of Bowood Lane. Key permanent features of this section will include an overbridge north of Great Missenden, providing a replacement of Leather Lane. A second overbridge east of Cottage Farm will provide an offline replacement of farm access and a third overbridge south of Bowood Lane will provide a replacement of footpath TLE/2 and farm access. A further overbridge south of Strawberry Hill Farm provides a replacement of Bowood Lane.
- 7.6.10 The Proposed Scheme will continue to the north-west onto Wendover Dean viaduct. This section of the route, extends from north of Bowood Lane to south of Rocky Lane (also known as Chesham Lane). Key permanent features of this section will include a viaduct at Wendover Dean to carry the Proposed Scheme over footpath WEN/39. Diversion of the access to Strawberry Hill Farm, Footpath WEN/39 and access to Upper Wendover Dean Farm will pass underneath the viaduct.
- 7.6.11 The Proposed Scheme will continue onto Small Dean viaduct and adjacent earthworks. This section extends from just south of Rocky Lane (also known as Chesham Lane) to just south of Baccombe Lane on the western edge of Wendover. Key permanent features of this section will include an underbridge east of the A413 London Road, providing a replacement of Rocky Lane (also known as Chesham Lane) and a viaduct to carry the Proposed Scheme over the A413 London Road, the Marylebone to Aylesbury Line and Small Dean Lane. An underbridge west of the A413 Nash Lee Road will provide access to Gove Farm, the nearby drainage areas and the green tunnel portal buildings.
- 7.6.12 The Proposed Scheme will continue to the west of Wendover through the Wendover green tunnel, emerging just beyond the western edge of Wendover. Key permanent features of this section will include Wendover green tunnel southern portal south of Baccombe Lane, with an associated access track. There will be a Wendover green tunnel northern portal just beyond the western edge of Wendover, with an associated access track.
- 7.6.13 The Proposed Scheme continues into the Wendover north cutting. This section of route extends from the western edge of Wendover to just north of Footpath ELL/20. Key permanent features of this section will include an overbridge east of Nash Lee providing a replacement of Nash Lee Road and a diversion of Nash Lee Lane to Nash Lee Road, which will be stopped up on either side of the Proposed Scheme. An overbridge north of Nash Lee Lane will provide an offline replacement of Footpath ELL/20.

Dunsmore, Wendover & Halton (CFA10) assessment methodology

- 7.6.14 Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The factors have been derived for the individual road types and relevant wards. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday.
- 7.6.15 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading. As a consequence, local transport impacts may be over-estimated.
- 7.6.16 The link capacities of roads within the study area have been analysed to identify any that are likely to experience traffic congestion in the future baseline, without the Proposed Scheme. Operation of the Proposed Scheme will not result in any additional traffic on roads within this study area. Therefore, link capacities have only been assessed for those roads affected by the Proposed Scheme during construction.
- 7.6.17 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021 baseline have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Dunsmore, Wendover & Halton (CFA10) future baseline

Key future baseline issues

- 7.6.18 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 9%-19%
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 16%-32%
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 32%-66%

7.6.19 As a result of this analysis, the road subject to assessment within the study area which will potentially experience peak period intermittent traffic congestion and delay in the 2021 future baseline situation, without Proposed Scheme traffic, is listed below.

- A413 London Road , between junction with Small Dean Lane and junction with Dunsmore Lane.

7.6.20 There are no other key future baseline issues identified within the study area.

Land use assumptions

7.6.21 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional localised traffic growth not accounted for by the growth factors previously described.

7.6.22 Within the study area, there are no committed developments which are considered to require adjustment to the SPD quantums within TEMPRO, which already account for future development in the study area.

7.6.23 The TEMPRO growth factors used in the study area are shown in 7-55.

Table 7-55: Dunsmore, Wendover & Halton summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	9-17%	16-28%	32-58%
Maximum	18-19%	30-32%	65-66%
Average	14-18%	23-30%	48-62%

Transport growth assumptions

7.6.24 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.

7.6.25 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.

Strategic and local road network traffic flows

- 7.6.26 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are the A413 London Road /Nash Lee Road, A4010 Risborough Road, B4009 Nash Lee Road, Small Dean Lane, Rocky Lane (also known as Chesham Lane), Bowood Lane, Baccombe Lane, Nash Lee Lane, North Lee Lane, South Street, and Pond Street/Ellesborough Road.
- 7.6.27 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B(iii).
- 7.6.28 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.6.29 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area , are presented in Table 7-56 and Table 7-57 for AM peak and PM peak flows respectively.
- 7.6.30 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-58 and Table 7-59 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.6.31 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-56: Dunsmore, Wendover & Halton strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A413 London Road (south of Small Dean Lane) (Wendover)	NB	749	9	875	10	961	11	1221	14	126	212	472	17%	28%	63%
	SB	1156	21	1351	25	1484	27	1885	35	195	328	729	17%	28%	63%
A413 London Road (south of Dunsmore Lane) (Wendover)	NB	749	9	875	10	961	11	1221	14	126	212	472	17%	28%	63%
	SB	1156	21	1351	25	1484	27	1885	35	195	328	729	17%	28%	63%
A413 Nash Lee Road (Wendover)	NB	604	21	706	25	776	28	985	35	102	172	381	17%	28%	63%
	SB	808	26	945	30	1038	33	1319	42	137	230	511	17%	28%	63%
A413 Wendover Bypass (Wendover)	NB	690	32	807	38	886	42	1125	53	117	196	435	17%	28%	63%
	SB	876	39	1024	46	1125	50	1429	64	148	249	553	17%	28%	63%
A4010 Aylesbury Rd/ Risborough Rd (Little Kimble)	EB	679	7	794	8	872	9	1108	12	115	193	429	17%	28%	63%
	WB	767	8	896	10	985	11	1251	13	129	218	484	17%	28%	63%
A4010 Risborough Rd (Stoke Mandeville)	NB	724	27	839	31	918	34	1157	43	115	194	433	16%	27%	60%
	SB	844	28	978	32	1071	35	1349	45	134	227	505	16%	27%	60%
B4009 Nash Lee Rd (Wendover)	EB	519	8	608	9	668	10	847	3	89	149	328	17%	29%	63%
	WB	584	5	684	6	751	7	952	6	100	167	368	17%	29%	63%

Table 7-57: Dunsmore, Wendover & Halton strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A413 London Road (south of Small Dean Lane) (Wendover)	NB	1232	6	1453	8	1607	8	2079	11	221	375	847	18%	30%	69%
	SB	776	5	916	6	1012	6	1310	8	140	236	534	18%	30%	69%
A413 London Road (south of Dunsmore Lane) (Wendover)	NB	1232	6	1453	8	1607	8	2079	11	221	375	847	18%	30%	69%
	SB	776	5	916	6	1012	6	1310	8	140	236	534	18%	30%	69%
A413 Nash Lee Road (Wendover)	NB	901	10	1063	12	1175	13	1520	17	162	274	619	18%	30%	69%
	SB	565	12	667	15	737	16	954	21	102	172	389	18%	30%	69%
A413 Wendover Bypass (Wendover)	NB	1061	16	1252	18	1384	20	1791	26	191	323	730	18%	30%	69%
	SB	681	11	804	13	888	14	1150	19	123	207	469	18%	30%	69%
A4010 Aylesbury Rd/ Risborough Rd (Little Kimble)	EB	582	2	688	2	760	2	982	3	106	178	400	18%	30%	69%
	WB	467	2	552	3	610	3	788	4	85	143	321	18%	30%	69%
A4010 Risborough Rd (Stoke Mandeville)	NB	947	16	1104	18	1213	20	1548	26	157	266	601	17%	28%	63%
	SB	685	7	799	9	878	10	1120	12	114	193	435	17%	28%	63%
B4009 Nash Lee Rd (Wendover)	EB	192	5	222	6	243	6	304	8	30	51	112	18%	31%	69%
	WB	366	2	423	2	463	2	579	3	57	97	213	18%	31%	69%

Table 7-58: Dunsmore, Wendover & Halton local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Leather Lane (South Heath)	EB	27	0	29	0	31	0	36	0	2	4	9	9%	16%	34%
	WB	34	0	38	0	40	0	46	0	4	6	12	9%	16%	34%
Bowood Lane (Wendover Dean)	NB	0	0	0	0	0	0	0	0	0	0	0	9%	16%	34%
	SB	0	0	0	0	0	0	1	0	0	0	1	9%	16%	34%
King's Lane (Kingsash)	NB	1	0	1	0	1	0	1	0	0	0	0	9%	16%	34%
	SB	2	0	2	0	2	0	3	0	0	0	1	9%	16%	34%
Rocky Lane (Kingsash)	NB	77	0	85	0	90	0	104	1	8	13	27	9%	16%	34%
	SB	63	0	68	0	73	0	84	0	5	10	21	9%	16%	34%
Dunsmore Lane (Wendover)	EB	17	1	20	2	21	2	27	2	3	4	10	17%	29%	63%
	WB	14	0	16	0	18	1	23	1	2	4	9	17%	29%	63%
Small Dean Lane (Wendover)	NB	2	0	3	0	3	0	4	0	1	1	2	17%	29%	63%
	SB	3	0	3	0	4	0	5	0	0	1	2	17%	29%	63%
London Road/ South Street (Wendover)	NB	220	1	256	1	281	2	357	2	36	61	137	16%	27%	62%
	SB	380	1	442	1	484	1	616	2	62	104	236	16%	27%	62%
Bacombe Lane (Wendover)	EB	6	0	6	0	7	0	9	0	0	1	3	17%	29%	63%
	WB	4	0	5	0	5	0	7	0	1	1	3	17%	29%	63%
Ellesborough Road/ Pound Street (Wendover)	EB	227	1	266	1	292	1	370	1	39	65	143	17%	29%	63%
	WB	342	8	400	9	439	10	557	13	58	97	215	17%	29%	63%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Nash Lee Lane (Wendover)	NB	8	0	9	0	9	0	12	0	1	1	4	15%	25%	54%
	SB	14	0	15	0	17	0	21	0	1	3	7	15%	25%	54%
North Lee Lane (Stoke Mandeville)	NB	69	0	80	0	88	0	110	0	11	19	41	16%	27%	60%
	SB	88	1	102	1	112	1	141	1	14	24	53	16%	27%	60%

Table 7-59: Dunsmore, Wendover & Halton local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Leather Lane (South Heath)	EB	24	0	26	0	28	0	32	0	2	4	8	9%	17%	35%
	WB	15	0	17	0	18	0	21	0	2	3	6	9%	17%	35%
Bowood Lane (Wendover Dean)	NB	0	0	0	0	0	0	1	0	0	0	1	9%	17%	35%
	SB	1	0	1	0	1	0	1	0	0	0	0	9%	17%	35%
King's Lane (Kingsash)	NB	1	0	2	0	2	0	2	0	1	1	1	9%	16%	35%
	SB	1	0	1	0	1	0	1	0	0	0	0	9%	16%	35%
Rocky Lane (Kingsash)	NB	67	0	73	0	78	0	90	0	6	11	23	9%	17%	35%
	SB	48	0	53	0	56	0	65	0	5	8	17	9%	17%	35%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Dunsmore Lane (Wendover)	EB	16	0	19	0	21	0	27	0	3	5	11	18%	31%	69%
	WB	14	1	16	1	18	1	23	1	2	4	9	18%	31%	69%
Small Dean Lane (Wendover)	NB	8	0	10	0	11	0	14	0	2	3	6	18%	31%	69%
	SB	8	0	9	0	10	0	13	0	1	2	5	18%	31%	69%
London Road/ South Street (Wendover)	NB	382	1	449	1	495	1	641	1	67	113	259	17%	29%	68%
	SB	235	1	276	1	304	1	394	1	41	69	159	17%	29%	68%
Bacombe Lane (Wendover)	EB	3	0	3	0	4	0	5	0	0	1	2	18%	31%	69%
	WB	6	0	7	0	7	0	9	0	1	1	3	18%	31%	69%
Ellesborough Road/ Pound Street (Wendover)	EB	320	1	378	2	418	2	540	2	58	98	220	18%	31%	69%
	WB	233	6	275	7	304	8	392	11	42	71	159	18%	31%	69%
Nash Lee Lane (Wendover)	NB	13	0	15	0	16	0	20	0	2	3	7	16%	26%	58%
	SB	9	0	11	0	12	0	14	0	2	3	5	16%	26%	58%
North Lee Lane (Stoke Mandeville)	NB	69	0	80	0	88	0	112	0	11	19	43	17%	28%	63%
	SB	54	0	63	0	69	0	88	0	9	15	34	17%	28%	63%

Dunsmore, Wendover & Halton (CFA10) Proposed Scheme construction description

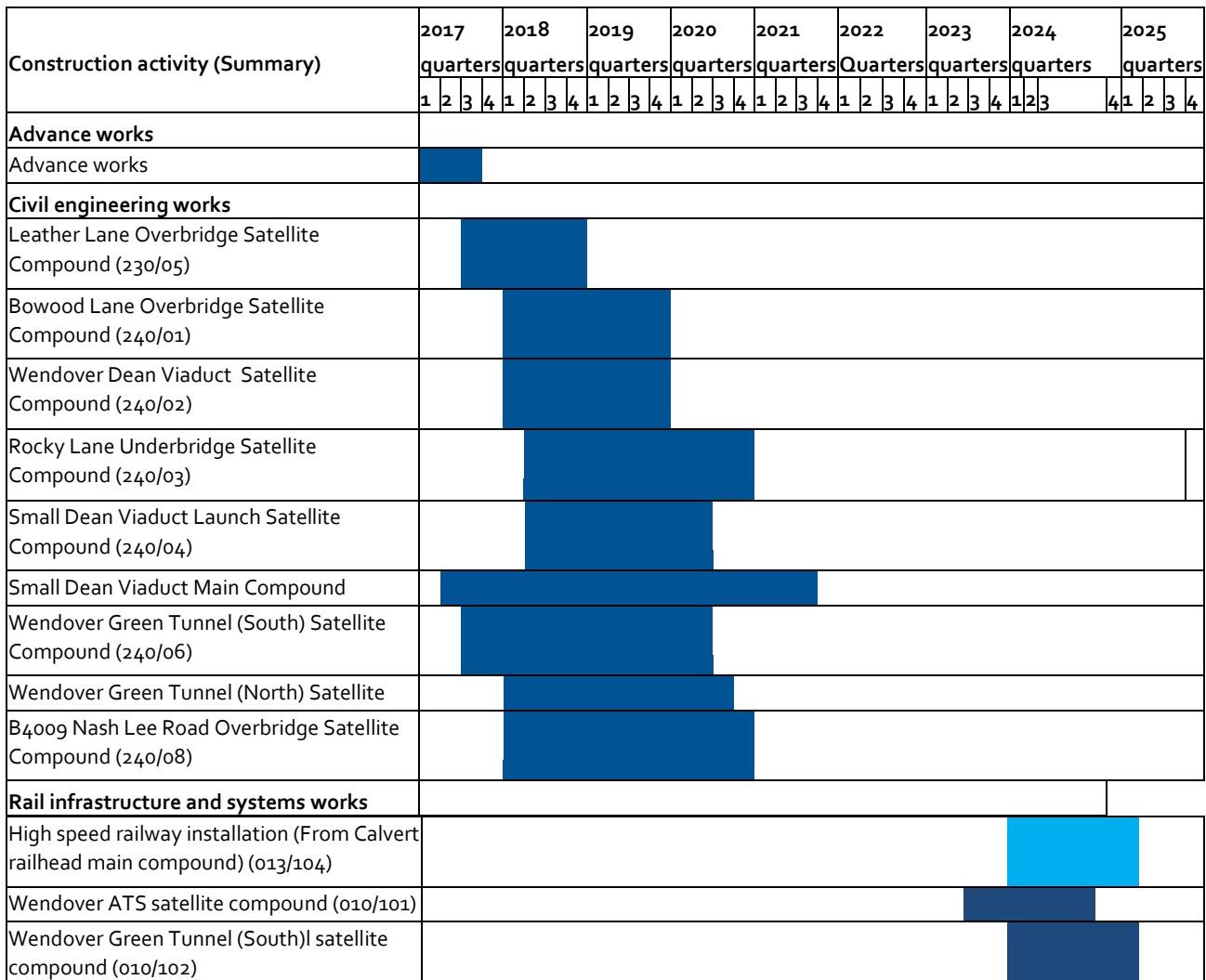
Construction activities

7.6.32 The major construction elements within the study area are as follows:

- South Heath cutting;
- Wendover Dean viaduct and adjacent earthworks;
- Small Dean viaduct and adjacent earthworks;
- Wendover green tunnel; and
- Wendover north cutting.

7.6.33 Details of the construction phasing are provided in Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-6.

Figure 7-6: Dunsmore, Wendover & Halton construction activity phasing



Wendover Green Tunnel (North) satellite compound (0240/08)		
Commissioning		
Commissioning (until end 2026)		

Compounds and construction sites

- 7.6.34 Main site compounds would be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds would generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.6.35 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-60. There are no compounds within the study area with shift working (24 hours).
- 7.6.36 The location of compounds is shown on Maps CT-05-035 to CT-05-034b (Volume 2, Map Book 10).

Table 7-60: Dunsmore, Wendover & Halton assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of the construction programme	
		Average	Peak
Main	Small Dean viaduct	91	134
Satellite	Leather Lane overbridge	72	129
Satellite	Bowood Lane overbridge	64	122
Satellite	Wendover Dean viaduct	85	95
Satellite	Rocky Lane underbridge/Wendover auto-transformer station	24	77
Satellite	Small Dean viaduct launch	94	100
Satellite	Wendover Green (south)	72	91
Satellite	Wendover green tunnel (south portal) (rail systems)	5	7

Compound type	Location	Assumed daily workforce per site for duration of the construction programme	
		Average	Peak
Satellite	Wendover green tunnel (north)	65	78
Satellite	B4009 Nash Lee Road overbridge	27	45

Construction trip assumptions

Trip generation

- 7.6.37 The duration of when there will be busy transport activity at each site is shown in Table 7-61. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-61: Dunsmore, Wendover & Halton typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Main	Small Dean viaduct	Small Dean Lane and A413	2017	Four years and three months	42 months	120-150	10-20
Satellite	Leather Lane overbridge	Leather Lane , Potter Row, King's Lane, B485 Chesham Road and A413	2017	One year and three months	14 months	100-130	<10
Satellite	Bowood Lane overbridge	Haul Road from Leather Lane, Potter Road, King's Lane, B485 Chesham Road and A413	2018	Two years	18 months	100-130	20-30

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Wendover Dean viaduct	Via haul road from Rocky Lane and A413	2018	Two years	19 months	40-50	20-30
Satellite	Rocky Lane underbridge/ Wendover auto-transformer station	Rocky Lane and A413	2018	Six years and nine months	19 months	50-60	<10
Satellite	Small Dean viaduct launch	Haul Road from Rocky Lane and A413	2018	Two years	22 months	90-100	20-30
Satellite	Wendover Green (south)	Haul road from Small Dean viaduct main compound, Small Dean Lane and A413	2017	Two years and nine months	32 months	80-100	40-50
Satellite	Wendover green tunnel (south portal) (rail systems)		2023	One year and three months			
Satellite	Wendover green tunnel (north)	Haul road from Small Dean viaduct main compound and A413	2018	Two years and six months	26 months	70-90	40-50
Satellite	B4009 Nash Lee Road overbridge	B4009 Nash Lee Road and A413 or A4010	2018	Seven years	40 months	50-110	40-90

7.6.38 Information on the indicative construction programme is provided in Figure 7-6 which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-61. Consequently the peak traffic movements presented in will not generally occur at the same time, although in some instances there may be some overlap.

7.6.39 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment

7.6.40 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;
- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network; and
- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

7.6.41 Within the study area, mass-haul movements have been assigned to A413 (between boundary of CFA09 and B4009 Nash Lee Road) and B4009 Nash Lee Road (between A413 and the Proposed Scheme).

7.6.42 Within the study area, construction traffic has been assigned to the roads listed in the construction lorry routes section below. Workforce traffic has been assigned to the same roads, with Leather Lane, Bowood Lane and King's Lane in addition.

7.6.43 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.

7.6.44 From the neighbouring areas to the south, including the Central Chilterns (CFA9) and The Chalfonts and Amersham (CFA8) areas, the cumulative construction traffic flows of approximately 120 cars/LGVs per day (two-way) and 30 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to the A413.

- 7.6.45 From the neighbouring areas to the north, including the Stoke Mandeville and Aylesbury (CFA11) area, the cumulative construction traffic flows of approximately 70 cars per day (two-way) and 10 HGVs (two-way) have been included in the assessment for this area. These flows have been assigned to A4010 Risborough Rd and B4009.

Construction lorry routes

- 7.6.46 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Map TR-03-054 (Volume 5, Map Book 71):
- Small Dean viaduct main compound will be accessed via Small Dean Lane and A413;
 - Leather Lane overbridge satellite compound will be accessed via Leather Lane , Potter Row, King's Lane, B485 Chesham Road and A413;
 - Bowood Lane overbridge satellite compound will be accessed via haul road from Leather Lane, Potter Road, King's Lane, B485 Chesham Road and A413;
 - Wendover Dean viaduct satellite compound will be accessed via haul road from Rocky Lane and A413;
 - Rocky Lane underbridge and Wendover auto-transformer station satellite compounds will be accessed via Rocky Lane and A413;
 - Small Dean viaduct launch satellite compound will be accessed via haul road from Rocky Lane and A413;
 - Wendover Green (south) and Wendover green tunnel (south portal) (rail systems) satellite compounds will be accessed via haul road from Small Dean viaduct main compound, Small Dean Lane and A413;
 - Wendover green tunnel (north) satellite compound will be accessed via haul road from Small Dean viaduct main compound and A413; and
 - B4009 Nash Lee Road overbridge satellite compound will be accessed via B4009 Nash Lee Road and A413 or A4010.

Traffic management, road closures and diversions

- 7.6.47 The roads in the study area that will be subject to temporary closure during construction of the Proposed Scheme are summarised in Table 7-62.
- 7.6.48 The approximate length of diversions listed is the 'worst case' scenario based on the maximum distance from one side of the road closure to the other. In reality, a proportion of vehicles diverted will be subject to a diversion distance less than what is reported.

Table 7-62: Dunsmore, Wendover & Halton temporary road closures and diversions

Name	Location	Location (chainage)	Diversion route	Approximate length of diversions	Programme	Duration
Bowood Lane Overbridge	Wendover Dean	050+100	A413 London Road, Rocky Lane/Chesham Lane and King's Lane. Alternative diversion via Potters Row, Leather Lane and A413 London Road.	4.7km	Sep 2018	Up to one year
Small Dean Lane	Wendover	053+000	A413 London Road and Dunsmore Road.	2.7km	Jun 2018	Up to nine months
Bacombe Lane	Wendover	053+950	South Street, Pound Street, Ellesborough Road and a temporary link road between Ellesborough Road and Bacombe Lane	1.5km	Sep 2017	Up to one year
Ellesborough Road	Wendover	054+200	Temporary link to the west of Ellesborough Road.	Negligible	Feb 2018	Up to two years
A413 London Road	Wendover Dean	052+700	Diversion to the west of existing alignment.	100m	June 2018	Up to one year and six months

- 7.6.49 The temporary diversions will affect 10 vehicles a day (12 hour 2021 base flow) on Bowood Lane, although given the relatively low flow of traffic, the impact of the temporary diversion is not considered to be a substantial impact upon motorised users.
- 7.6.50 The temporary diversion will affect approximately 120 vehicles a day on Small Dean Lane, approximately 150 vehicles a day on Bacombe Lane.
- 7.6.51 The temporary diversions will affect approximately 5,410 vehicles a day on Ellesborough Road and approximately 20,450 vehicles a day on A413 London Road; however the diversion distances are low and are therefore not considered to be a substantial impact upon motorised users.
- 7.6.52 The following roads are to be realigned; however construction of the new roads will be carried out 'off-line', meaning that the existing roads will remain open with no diversion of traffic required until the new off-line sections of road are complete. Traffic management and/or very short term closures i.e. overnight, off-peak or weekend, may be required to tie the new off-line sections of road into existing roads immediately before switchover, although these are not considered to have a substantial impact upon motorised users.
- Nash Lee Lane;
 - Rocky Lane underbridge; and

- B4009 Nash Lee Road.

PRoW closures and diversions

- 7.6.53 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-63.
- 7.6.54 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.
- 7.6.55 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-035 to CT-05-034b (Volume 2, Map Book 10).

Table 7-63: Dunsmore, Wendover & Halton temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
Cottage Farm Accommodation Footbridge	Wendover Dean	049+300	June 2018	50m Up to nine months	Construction of Cottage Farm Accommodation overbridge Private access remains open during construction of the overbridge structure, with temporary diversion to the south of existing alignment along the boundary of construction works.
Public Footpath TLE/2/2	Wendover Dean	049+800	June 2018	50m Up to nine months	Construction of TLE/2 Accommodation overbridge Temporary diversion to the east of existing alignment along the boundary of the footbridge construction works.
Bowood Lane	Wendover Dean	050+125	Sep 2018	550m Up to one year	Construction of Bowood Lane overbridge Footpath remains open during construction of TLE/2/2 Footbridge at Ch 49+800, then is temporary diverted onto this footbridge until completion of Bowood Lane Overbridge.
TLE/3/1 (public footpath)	Wendover Dean	050+125	Sep 2018	550m Up to one year	Construction of Bowood Lane overbridge Footpath remains open during construction of TLE/2/2 Footbridge at Ch 49+800, then is temporary diverted onto this footbridge until completion of Bowood Lane Overbridge.
TLE/5/2 (public footpath)	Wendover Dean	050+500	Jan 2018	100m Up to nine months	Construction of Wendover Dean Viaduct Footpath and private access may require temporary diversion between viaduct piers to east side of the Proposed Scheme route, then running parallel to viaduct

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
					work site and to WEN/36/2.
WEN/36/1 - Chiltern Way trails (public footpath)	Wendover Dean	050+700	Jan 2018	100m Up to two years	Construction of Wendover Dean Viaduct Temporary diversion between viaduct piers to east side of the Proposed Scheme route, then running parallel to viaduct work site and to TLE/5/2. Pedestrian control required where diversion route crosses construction site.
WEN/39/2 (public footpath)	Wendover Dean	050+950	Jan 2018	100m Up to two years	Construction of Wendover Dean Viaduct Temporary diversion between viaduct piers to east side of the Proposed Scheme route, then running parallel to viaduct work site. Pedestrian control required where diversion route crosses construction site.
WEN/57/1 - Icknield Way trail (public bridleway)	Wendover	053+100	July 2018	2.2km Up to nine months	Upgrading of Grove Farm Access and construction of Grove Farm Accommodation underbridge. Temporary diversion to WEN/14/2, WEN/14/1, WEN/27(BW)/1, WEN/13(BW)/1, WEN/13(BW)/2, WEN/13(BW)/3, WEN/13(BW)/4 and WEN/13(BW)/5 during construction/improvement works for Grove Farm Access and Small Dean Lane.
WEN/13A/1 (public footpath)	Wendover	054+000	Feb 2018	200m Up to one year	Construction of Wendover Green Tunnel Local diversion of footpath to suit construction of green tunnel as required.
WEN/15A/2 - Ridgeway Trail (public footpath)	Wendover	054+100	Feb 2018	200m Up to two years	Construction of Wendover Green Tunnel Temporary diversion along existing Ellesborough Road footpath to temporary link road before connecting back to existing footpath WEN/15A/2.
WEN/6/2	Wendover	054+200	Feb 2018	800m Up to 2 years and 3 months	Construction of Wendover Green Tunnel Temporary diversion from WEN/6/1 to south of construction boundary (stockpile), WEN/11/1 & Ellesborough Road.
WEN/6/3 - Aylesbury Ring Trail (public footpath)	Wendover	054+200	Feb 2018	800m Up to 2 years and 3 months	Construction of Wendover Green Tunnel Temporary diversion from WEN/6/1 to south of construction boundary (stockpile), WEN/11/1 & Ellesborough Road.

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
Ellesborough Road	Wendover	054+200	Feb 2018	200m Approximately 20-24 months	Construction of Wendover Green Tunnel Temporary diversion via temporary link to east of Ellesborough Road.
WEN/11/1	Wendover	054+300	Feb 2018	300m Up to 2 years and 3 months	Construction of Wendover Green Tunnel Temporary diversion to Ellesborough Road to suit construction of green tunnel as required.
WEN/11/2 (Two public footpaths)	Wendover	054+300	Feb 2018	300m Up to 2 years and 3 months	Construction of Wendover Green Tunnel Temporary diversion to Ellesborough Road to suit construction of green tunnel as required.
WEN/55/1 (public footpath)	Wendover	054+875	Feb 2018	200m Up to 2 years and 3 months	Construction of Wendover Green Tunnel Temporary diversion to the east of the existing route during construction of the green tunnel.
ELL/25/1 (public footpath)	Wendover	056+000	Feb 2018	650m Up to one year and 6 months	Construction of B4009 Nash Lee Road Overbridge Temporary diversion to the south of construction boundary, existing Nash Lee Road and new access to Nash Lee Lane.

7.6.56 The following PRoW will be temporarily diverted by a negligible distance during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:

- Small Dean Lane.

7.6.57 The following PRoW are likely to remain open during construction of the Proposed Scheme and are therefore not considered to be impacted:

- WEN/15A/2;
- Rocky Lane;
- B4009 Nash Lee Road;
- Nash Lee Lane;
- Grove Farm;
- WEN/14/4 (public bridleway); and
- Baccombe Lane.

7.6.58 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:

- old link road between Small Dean Lane and A413 London Road;
- Baccombe Lane;
- Grove Farm;
- WEN/14/4 (public bridleway); and
- ELL/25/1 (public footpath).

Utilities works

7.6.59 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area.

7.6.60 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Roads within the study area which will be affected by utility works are:

- A413 London Road /Nash Lee Road;
- Ellesborough Road;
- Babcombe Lane; and
- B4009 Nash Lee Road.

Avoidance and mitigation measures

7.6.61 The following measures have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce impacts on transport users:

- transporting construction materials and equipment within and along haul roads adjacent to the Proposed Scheme alignment where reasonably practicable to reduce lorry movements on the public highway;
- the majority of roads crossing the Proposed Scheme will be kept open during

construction, resulting in reduced diversions of traffic onto alternative routes;

- provision of temporary alternative routes and/or building structures early to maintain connectivity for PRoW closed during construction to reduce loss of amenity;
- HGV routed as far as reasonably practicable along the strategic road network, using designated routes for access, as shown in Map TR-03 -054 (Volume 5, Traffic and Transport Map Book); and
- providing on-site accommodation and welfare facilities to reduce daily travel by site workers.

7.6.62 The draft CoCP (see Volume 5: Appendix CT-003-000) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips, during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.6.63 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an overarching framework travel plan⁴ that will require travel plans to be used, along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where reasonably practicable in the rural context, this will encourage the use of sustainable modes of transport or vehicle sharing.

7.6.64 The reductions in traffic generation arising from the travel plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.

7.6.65 The measures in the draft CoCP include clear controls on vehicle types, hours of site operation, and routes for HGV, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.

7.6.66 Specific measures will include:

- core site operating hours will be 08:00 to 18:00 on weekdays and 08:00 to 13:00 on Saturdays. Therefore site staff and workers will generally arrive

⁴ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

before the morning peak hour and depart after the evening peak hour (although assessment has assumed that some of work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario (draft CoCP, Section 5); and

- excavated material will be reused where reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

7.6.67 Rail replacement services will be provided when rail possessions are in place on the Marylebone to Aylesbury Line. Where practicable rail possessions will be scheduled to coincide with other planned rail possessions for engineering and maintenance works on the same line to minimise additional disruption to rail users

Dunsmore, Wendover & Halton (CFA10) construction impacts

Key construction transport issues

7.6.68 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.

- construction vehicle movements to and from the construction site compounds;
- temporary road closures and associated diversions of motorised users;
- temporary PRoW closures and associated diversions of non-motorised users; and
- short-term possessions of the Marylebone to Aylesbury Line.

7.6.69 No substantial traffic and transport impacts are expected on waterways and canals, public transport interchanges, parking and loading, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

7.6.70 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.

7.6.71 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-64 and Table 7-65 for AM peak and PM peak flows respectively.

Table 7-64: Dunsmore, Wendover & Halton strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A413 London Road, between Small Dean Lane and Dunsmore Lane	NB	749	875	924	23	49	13	6%	128%
	SB	1156	1351	1450	38	99	13	7%	51%
A413 London Road, between Dunsmore Lane and A4128 Link Road	NB	749	875	953	23	78	13	9%	128%
	SB	1156	1351	1407	38	56	13	4%	51%
A413 Nash Lee Road, between B4009 Nash Lee Road and London Road	NB	604	706	744	41	38	16	5%	64%
	SB	808	945	1056	46	111	16	12%	53%
B4009 Nash Lee Rd, between A4010 Aylesbury Road and A413 Nash Lee Road	EB	519	608	684	25	77	16	13%	185%
	WB	584	684	710	23	27	16	4%	270%
A4010 Aylesbury Rd/ Risborough Rd, between Longwick Road and B4009 Nash Lee Road	EB	679	794	930	31	136	22	17%	266%
	WB	767	896	929	32	32	22	4%	234%
A4010 Risborough Rd, between B4443 Lower Road and B4009 Nash Lee Road	NB	724	839	983	32	144	1	17%	4%
	SB	844	978	1142	33	163	1	17%	4%

Table 7-65: Dunsmore, Wendover & Halton strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A413 London Road, between Small Dean Lane and Dunsmore Lane	NB	1232	1453	1549	16	96	8	7%	107%
	SB	776	916	963	14	48	8	5%	145%
A413 London Road, between Dunsmore Lane and A4128 Link Road	NB	1232	1453	1502	16	49	8	3%	107%
	SB	776	916	985	14	69	8	8%	145%
A413 Nash Lee Road, between B4009 Nash Lee Road and London Road	NB	901	1063	1161	21	98	9	9%	77%
	SB	565	667	696	24	29	9	4%	62%
B4009 Nash Lee Rd, between A4010 Aylesbury Road and A413 Nash Lee Road	EB	192	222	706	15	18	9	3%	168%
	WB	366	423	617	11	66	9	12%	437%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
A4010 Aylesbury Rd/ Risborough Rd, between Longwick Road and B4009 Nash Lee Road	EB	582	688	1019	10	13	7	1%	333%
	WB	467	552	779	10	111	7	17%	275%
A4010 Risborough Rd, between B4443 Lower Road and B4009 Nash Lee Road	NB	947	1104	1252	19	148	1	13%	3%
	SB	685	799	938	9	139	1	17%	9%

- 7.6.72 During the construction period there will also be a number of roads within the local network that will be affected by the proposed highway works including:
- Bowood Lane - temporary road closure, to allow construction of overbridge;
 - Small Dean Lane - temporary road closure, to allow construction of realigned road;
 - Baccombe Lane - temporary road closure, to allow construction of realigned road; and
 - Ellesborough Road - temporary road closure, to allow construction of realigned road.

- 7.6.73 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-66 and Table 7-67 for AM peak and PM peak flows respectively.

Table 7-66: Dunsmore, Wendover & Halton local road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Leather Lane between A413 London Road and Potter Row	EB	27	29	44	0	15	0	52%	0%
	WB	34	38	56	0	19	0	50%	0%
Bowood Lane, between A413 London Road and King's Lane	NB	0	0	4	0	4	0	1100%	0%
	SB	0	0	33	0	32	0	7425%	0%
King's Lane, between Chesham Lane and Potter Row	NB	1	1	5	0	4	0	451%	0%
	SB	2	2	3	0	0	0	21%	0%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Rocky Lane (also known as Chesham Lane), between A413 London Road and King's Lane	NB	77	85	118	5	34	5	40%	1106%
	SB	63	68	118	5	50	5	73%	1475%
Dunsmore Lane, between A413 London Road and Small Dean Lane	EB	17	20	22	2	3	0	14%	0%
	WB	14	16	20	0	3	0	21%	0%
Small Dean Lane, between A413 London Road and Dunsmore Lane	NB	2	3	45	1	42	1	1491%	0%
	SB	3	3	5	1	2	1	53%	0%

Table 7-67: Dunsmore, Wendover & Halton local road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Leather Lane between A413 London Road and Potter Row	EB	24	26	44	0	17	0	67%	0%
	WB	15	17	31	0	14	0	86%	0%
Bowood Lane, between A413 London Road and King's Lane	NB	0	0	31	0	30	0	6958%	0%
	SB	1	1	4	0	3	0	515%	0%
King's Lane, between Chesham Lane and Potter Row	NB	1	2	2	0	0	0	29%	0%
	SB	1	1	5	0	4	0	411%	0%
Rocky Lane (also known as Chesham Lane), between A413 London Road and King's Lane	NB	67	73	117	2	44	2	60%	1477%
	SB	48	53	81	2	28	2	54%	0%
Dunsmore Lane, south of A413 London Road	EB	16	19	28	0	10	0	52%	0%
	WB	14	16	25	1	9	0	55%	0%

Location	Direction		2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline		
					All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles									
Small Dean Lane, between A413 London Road and Dunsmore Lane	NB	8	10	10	0	1	0	6%	0%		
	SB	8	9	47	0	38	0	430%	0%		

- 7.6.74 Roads on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users (although in addition may also have an increase in other traffic generated by the construction of the Proposed Scheme) are:
- A413 London Road (between Bowood Lane and Rocky Lane), Rocky Lane/Chesham Lane and King's Lane, for up to one year from September 2018;
 - A413 London Road (between Small Dean Lane and Dunsmore Road) and Dunsmore Road, for up to nine months from June 2018; and
 - South Street (between Baccombe Lane and Pound Street), Pound Street (between South Street and Ellesborough Road), and Ellesborough Road (between Pound Street and a temporary Link Road between Ellesborough Road and Baccombe Lane), for up to one year from September 2017.
- 7.6.75 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- A413 (between boundary of CFA09 and the B4009 Nash Lee Road); and
 - B4009 Nash Lee Road (between A413 and the Proposed Scheme).
- 7.6.76 The HGVs used for the transportation of construction materials and equipment will use designated lorry routes as described in Section 7.6.46. Workforce traffic has been assigned to the same roads, with Leather Lane, Bowood Lane and King's Lane in addition. Some of these roads may also have an increase in other Proposed Scheme traffic.
- 7.6.77 The implementation of the draft CoCP (see Volume 5: Annex CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

Junction performance

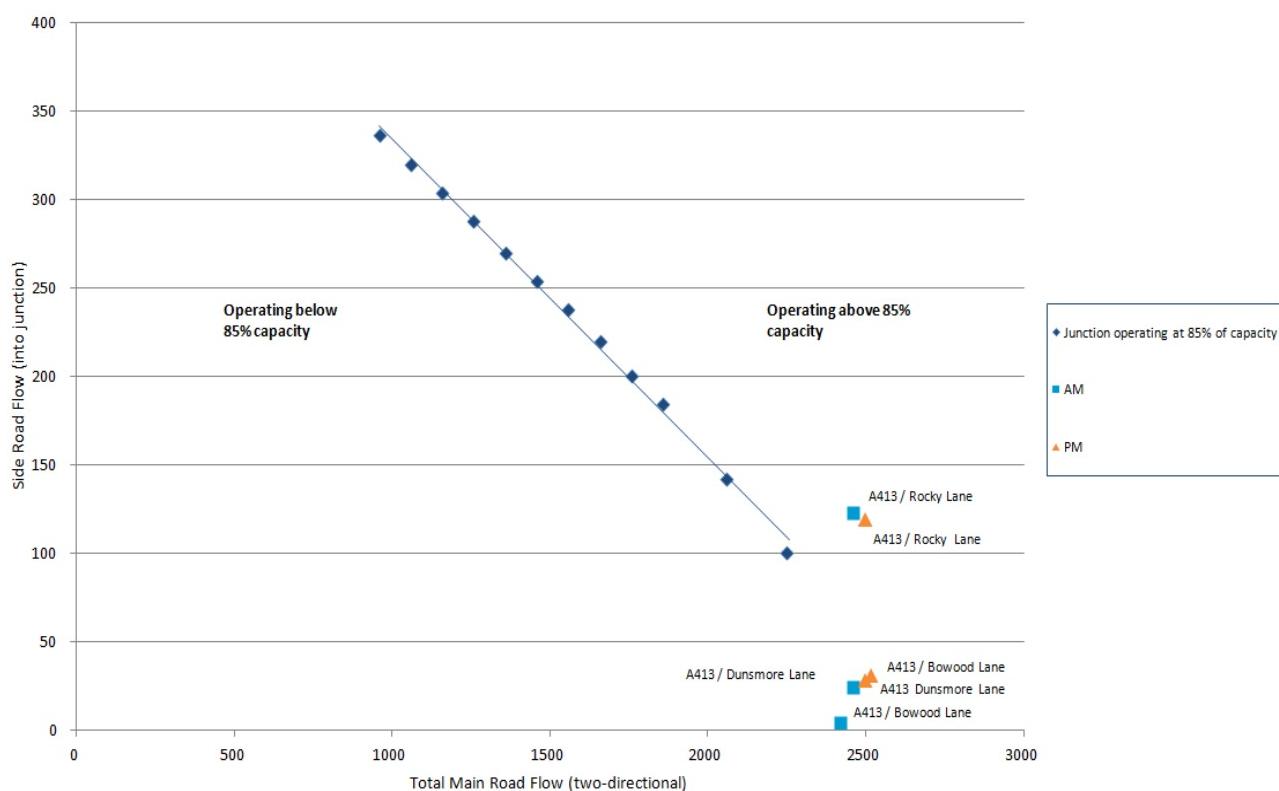
- 7.6.78 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.
- 7.6.79 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:
- A4010 Risborough Road with B4009 Nash Lee Road;
 - A413 Nash Lee Road with B4009 Nash Lee Road;
 - A413 Nash Lee Road with Small Dean Lane;
 - A413 London Road with Nash Lee Road;
 - A413 London Road with Rocky Lane (also known as Chesham Lane);
 - A413 London with Dunsmore Lane; and
 - A413 London Road with Bowood Lane.
- 7.6.80 Of the junctions above, A413 London Road with Bowood Lane, A413 London Road with Rocky Lane (also known as Chesham Lane) and A413 London Road with Dunsmore Lane are priority junctions. The 2021 traffic flows with Proposed Scheme traffic (in PCU) of these junctions are shown in Table 7-68 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

Table 7-68: Dunsmore, Wendover & Halton priority junction flows

Junction	2021 With HS2 construction traffic			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A413 London Road with Bowood Lane	2420	4	2516	31
A413 London Road with Rocky Lane (also known as Chesham Lane)	2463	123	2495	119
A413 London Road Dunsmore Lane	2463	24	2495	28

- 7.6.81 The priority junctions have been plotted on a graph, shown in Figure 7-7, that shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.
- 7.6.82 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-7: Dunsmore, Wendover & Halton priority junction assessment 2021



- 7.6.83 The graph illustrates that the A413 London Road with Dunsmore Lane and A413 London Road with Bowood Lane junctions fall below the 'threshold' of capacity during both AM and PM peaks and are therefore not forecast to be close to their theoretical capacity of 85% during construction of the Proposed Scheme. As a result, they are not considered to warrant individual assessment and have therefore not been assessed with junction assessment software.

- 7.6.84 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the junction of A413 London Road with Rocky Lane (also known as Chesham Lane) during construction of the Proposed Scheme. This may be mitigated through the measures detailed in the draft CoCP, as outlined previously.
- 7.6.85 The A413 London Road with Small Dean Lane and A413 Nash Lee Road with B4009 Nash Lee Road non-priority junctions have been modelled using industry standard software for the 2021 year of assessment, with and without the Proposed Scheme. The results, shown in Table 7-69 and Table 7-70, have been presented in terms of ratio of flow to capacity and maximum queue lengths to establish the impact of Proposed Scheme traffic during construction upon junction operation.

Table 7-69: Wendover comparison forecast baseline and construction scenario performance at A413 London Road/ Small Dean Lane junction (priority roundabout)

0800-09:00		2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/capacity %	Max queue	Flow (All PCU)	Flow/capacity %	Max queue	
London Road/South Street	443	34%	1	443	37%	1	
A413 London Road (S)	885	39%	1	947	42%	1	
Small Dean Lane	3	0%	0	46	7%	1	
A413 London Road (N)	975	49%	1	1102	57%	2	
Total	N/A	49%	N/A	N/A	57%	N/A	
17:00-18:00		2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/capacity %	Max queue	Flow (all PCU)	Flow/capacity %	Max queue	
London Road/ South Street	277	18%	1	277	19%	1	
A413 London Road (S)	1461	65%	2	1565	70%	2	
Small Dean Lane	10	3%	0	10	4%	0	
A413 London Road (N)	682	37%	1	720	40%	1	
Total	N/A	65%	N/A	N/A	70%	N/A	

Table 7-70: Wendover comparison forecast baseline and construction scenario performance at A413 Nash Lee Road/B4009 Nash Lee Road junction (priority roundabout)

0800-09:00	2021 Baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/capacity %	Max queue	Flow (All PCU)	Flow/capacity %	Max queue
A413 (NE)	1070	51%	1	1131	54%	2
A413 (S) Nash Lee Road	731	37%	1	785	40%	1
B4009 Nash Lee Road	617	34%	1	709	39%	1
Total	N/A	51%	N/A	N/A	54%	N/A
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/capacity %	Max queue	Flow (all PCU)	Flow/capacity %	Max queue
A413 (NE)	817	37%	1	817	37%	1
A413 (S) Nash Lee Road	1075	53%	2	1182	58%	2
B4009 Nash Lee Road	694	42%	1	721	45%	1
Total	N/A	53%	N/A	N/A	58%	N/A

7.6.86 The modelling results indicate that the junction of A413 London Road with Small Dean Lane is predicted to operate within capacity during construction of the Proposed Scheme, with the highest percentage of flow to capacity predicted as 70% on the A413 (S) arm in the PM Peak. As this is well below 85%, (considered to represent theoretical capacity), the impact of the Proposed Scheme is not considered to have a substantial impact on capacity at this junction.

7.6.87 The modelling results indicate that the junction of A413 Nash Lee Road with B4009 Nash Lee Road is predicted to operate well within capacity during construction of the Proposed Scheme, with the highest percentage of flow to capacity predicted as 58% on the A413 (S) Nash Lee Road arm in the PM Peak. As this is well below 85%, (considered to represent theoretical capacity), the impact of the Proposed Scheme is not considered to have a substantial impact on capacity at this junction.

- 7.6.88 A qualitative assessment has been carried out for the A4010 Risborough Road with B4009 Nash Lee Road and A413 London Road with Nash Lee Road non-priority junctions, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows (including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.
- 7.6.89 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at both A4010 Risborough Road with B4009 Nash Lee Road and A413 London Road with Nash Lee Road junctions during peak periods.

Accidents and safety

- 7.6.90 The proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Rail

- 7.6.91 The Marylebone to Aylesbury Line is a 63km railway line between London and Aylesbury, operated by Chiltern Railways. A frequent service is provided with two to four passenger trains during peak hours and two per hour at other times during the day. Services run seven days a week.
- 7.6.92 Within the study area the Marylebone to Aylesbury Line serves Wendover station.
- 7.6.93 The construction of the Proposed Scheme in this study area will require temporary possessions on the Marylebone to Aylesbury Line for the construction of Small Dean viaduct and demolition of School Hill overbridge. Table 7-71 summarises the possessions which are forecast to be required.

Table 7-71: Dunsmore, Wendover & Halton summary of rail possessions required

Element name	Location (chainage)	Description of works	Number of possessions	Type	Duration	Year/Duration
Small Dean Viaduct and demolition of bridges at 52+800	52+850 and 52+800	Small Dean viaduct: Temporary Works & Deck Installation (54hr); Parapet Construction (27hr); and Concrete infill & Acoustic Barrier (27hr).	3	All line block	54 hr possession	2018-2020
		Bridge demolition: Existing Bridge deck removal (two 54 hr).	2	All line block	27 hr possession	

Pedestrians, cyclists and equestrians

- 7.6.94 The review of PRoW links indicates there will be additional walking distances on 17 routes due to temporary diversions, with six of the links requiring a diversion of users of more than 500m.
- 7.6.95 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-035 to CT-05-034b (Volume 2, Map Book 10).
- 7.6.96 Table 7-72 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.6.97 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-035 to CT-05-034b (Volume 2, Map Book 10).

Table 7-72: Dunsmore, Wendover & Halton summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Journey Time (nearest minute)
Cottage Farm Accommodation Footbridge	Wendover Dean	049+300	Construction of Cottage Farm Accommodation overbridge	Private access remains open during construction of the overbridge structure, with temporary diversion to the south of existing alignment along the boundary of construction works.	No data available	50m	1 min
Public Footpath TLE/2/2	Wendover Dean	049+800	Construction of TLE/2 Accommodation	Temporary diversion to the east of existing alignment along the boundary of the	33	50m	1 min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
			n overbridge	footbridge construction works.			
Bowood Lane	Wendover Dean	050+125	Construction of Bowood Lane overbridge	Footpath remains open during construction of TLE/2/2 Footbridge at Ch 49+800, then is temporary diverted onto this footbridge until completion of Bowood Lane Overbridge.	25	550m	7 min
TLE/3/1 (public footpath)	Wendover Dean	050+125	Construction of Bowood Lane overbridge	Footpath remains open during construction of TLE/2/2 Footbridge at Ch 49+800, then is temporary diverted onto this footbridge until completion of Bowood Lane Overbridge.	25	550m	7 min
TLE/5/2 (public footpath)	Wendover Dean	050+500	Construction of Wendover Dean Viaduct	Footpath and private access may require temporary diversion between viaduct piers to east side of the Proposed Scheme route, then running parallel to viaduct work site and to WEN/36/2.	6	100m	1 min
WEN/36/1 - Chiltern Way trails (public footpath)	Wendover Dean	050+700	Construction of Wendover Dean Viaduct	Temporary diversion between viaduct piers to east side of the Proposed Scheme route, then running parallel to viaduct work site and to TLE/5/2. Pedestrian control required where diversion route crosses construction site.	25	100m	1 min
WEN/39/2 (public footpath)	Wendover Dean	050+950	Construction of Wendover Dean Viaduct	Temporary diversion between viaduct piers to east side of the Proposed Scheme route, then running parallel to viaduct work site. Pedestrian control required where diversion route crosses construction site.	6	100m	1 min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
WEN/57/1 - Icknield Way trail (public bridleway)	Wendover	053+100	Upgrading of Grove Farm Access and construction of Grove Farm Accommodation underbridge.	Temporary diversion to WEN/14/2, WEN/14/1, WEN/27(BW)/1, WEN/13(BW)/1, WEN/13(BW)/2, WEN/13(BW)/3, WEN/13(BW)/4 and WEN/13(BW)/5 during construction/improvement works for Grove Farm Access and Small Dean Lane.	0	2.2km	26 min
WEN/13A/1 (public footpath)	Wendover	054+000	Construction of Wendover Green Tunnel	Local diversion of footpath to suit construction of green tunnel as required.	No data available	200m	2 min
WEN/15A/2 - Ridgeway Trail (public footpath)	Wendover	054+100	Construction of Wendover Green Tunnel	Temporary diversion along existing Ellesborough Road footpath to temporary link road before connecting back to existing footpath WEN/15A/2.	38	200m	2 min
WEN/6/2	Wendover	054+200	Construction of Wendover Green Tunnel	Temporary diversion from WEN/6/1 to south of construction boundary (stockpile), WEN/11/1 & Ellesborough Road.	31	800m	10 min
Public Footpath WEN/6/3 - Aylesbury Ring Trail (public footpath)	Wendover	054+200	Construction of Wendover Green Tunnel	Temporary diversion from WEN/6/1 to south of construction boundary (stockpile), WEN/11/1 & Ellesborough Road.	31	800m	10 min
Ellesborough Road	Wendover	054+200	Construction of Wendover Green Tunnel	Temporary diversion via temporary link to east of Ellesborough Road.	113	200m	2 min
WEN/11/1	Wendover	054+300	Construction of Wendover Green Tunnel	Temporary diversion to Ellesborough Road to suit construction of green tunnel as required.	36	300m	4 min
WEN/11/2 (Two public footpaths)	Wendover	054+300	Construction of Wendover Green Tunnel	Temporary diversion to Ellesborough Road to suit construction of green	36	300m	4 min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
				tunnel as required.			
Public Footpath WEN/55/1	Wendover	054+875	Construction of Wendover Green Tunnel	Temporary diversion to the east of the existing route during construction of the green tunnel.	0	200m	2 min
ELL/25/1 (public footpath)	Wendover	056+000	Construction of B4009 Nash Lee Road Overbridge	Temporary diversion to the south of construction boundary, existing Nash Lee Road and new access to Nash Lee Lane.	15	650m	8 min

Dunsmore, Wendover & Halton (CFA10) Proposed Scheme operation description

Operation trip assumptions

- 7.6.98 It is forecast that there will be no substantial changes in demand on existing transport infrastructure within the study area due to the Proposed Scheme in 2026 and 2041.

Avoidance and mitigation measures

- 7.6.99 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in their current location, or very close to their current location resulting in no substantial diversions of traffic onto alternative routes; and
 - retaining PRoW crossing the Proposed Scheme, with localised realignments or diversions kept to a minimum.

- 7.6.100 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Dunsmore, Wendover & Halton (CFA10) operation impacts

- 7.6.101 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.

7.6.102 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.

Key operation transport issues

7.6.103 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.

- Permanent realignment or closure of PRoW and associated diversions to non-motorised users.

7.6.104 No substantial traffic and transport impacts are expected on the highway network, waterways and canals, rail services, public transport interchanges, public transport, parking and loading, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

7.6.105 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.

7.6.106 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.

7.6.107 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows with the Proposed Scheme are expected to remain the same as the 2026 and 2041 future baseline traffic flows. Therefore, no traffic impact assessment of operation of the Proposed Scheme is necessary in this study area.

Accidents and safety

7.6.108 There will be no impact on highway accidents and safety risk in the study area as there are no increases in traffic due to operation of the Proposed Scheme.

Pedestrians, cyclists and equestrians

7.6.109 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.

- 7.6.110 The review of PRoW links indicates that there will be additional walking distances on three routes due to permanent realignments, with one of the realigned links requiring a diversion of more than 500m. The old link road between Small Dean Lane and A413 will be permanently closed as a result of the Proposed Scheme. This PRoW was found to have 19 daily users, based upon 2012 baseline surveys.
- 7.6.111 Table 7-73 below presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.6.112 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-035 to CT-06-034b (Volume 2, Map Book 10).

Table 7-73: Dunsmore, Wendover & Halton summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
Old link road between Small Dean Lane and A413	Wendover	052+800	Permanent closure of PRoW	19	Permanent closure of PRoW	Permanent closure of PRoW
Bacombe Lane	Wendover	053+800	Permanently diverted to the offline Bacombe Lane.	No data available	zoom	2 min
WEN/14/4 (public bridleway)	Wendover	053+800	Permanently diverted to the offline Bacombe Lane.	13	zoom	2 min
ELL/25/1 (public footpath)	Wendover	056+000	Footpath permanently diverted across new Nash Lee Road overbridge and Nash Lee Lane access.	15	600m	7 min

- 7.6.113 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

7.7**Stoke Mandeville and Aylesbury (CFA11)****Stoke Mandeville and Aylesbury (CFA11) Proposed Scheme description**

- 7.7.2 The Proposed Scheme through this area will be approximately 10.5km in length. The route will commence just north of Nash Lee and continue north-west under Risborough Road, Marsh Lane and the Princes Risborough to Aylesbury Line. The route will pass to the west of Stoke Mandeville and Aylesbury, passing under the A418 Oxford Road, and will then proceed to the east of Hartwell House. It will cross the River Thame to the east of Waddesdon, heading north-west across the Aylesbury Vale to exit the area south of the A41 Bicester Road.
- 7.7.3 The area is predominantly rural land, consisting of mixed agricultural land. The Proposed Scheme will pass approximately 270m from the southern tip of Stoke Mandeville and then approximately 200m from the southern edge of Aylesbury. The route will pass within 1.1km of Bishopstone, 1km of Stone, and within 800m and 330m of Upper and Lower Hartwell respectively. These villages lie to the south of the Proposed Scheme.
- 7.7.4 The Stoke Mandeville and Aylesbury study area includes: the A41 Bicester Road, A413 Wendover Road/Nash Lee Road, A4010 Risborough Road/Station Road, A418 Aylesbury Road/Oxford Road, A4157 Weedon Road/Elmhurst Road, B4009 Nash Lee Road, B4443 Lower Road and local roads that are affected by the Proposed Scheme. The Proposed Scheme crosses four roads within the study area.
- 7.7.5 Within the study area, a bypass around Stoke Mandeville is proposed following discussions between HS2 Ltd and BCC as a means of reducing environmental impacts arising from existing traffic along A410 Risborough Road and from the impacts arising from raising A410 Risborough Road to cross the Proposed Scheme. The Stoke Mandeville bypass will connect A410 Risborough Road with B4443 Lower Road, to the south of Stoke Mandeville. The bypass will result in the permanent closure of A4010 Risborough Road (between the bypass and the A4010 Risborough Road/B4443 Lower Road/A410 Station Road junction), Old Risborough Road (northern access only) and Marsh lane (east of Stoke Mandeville bypass).
- 7.7.6 There are two railway lines within the area. The Princes Risborough to Aylesbury Line runs south to north within the area and will cross the route to the west of Stoke Mandeville via a new overbridge. The Marylebone to Aylesbury Line runs broadly parallel to the Proposed Scheme to the east of the route and there are passenger rail stations at Stoke Mandeville, Aylesbury and Aylesbury Vale Parkway within the area.

- 7.7.7 PRoW within the area include the Thame Valley Walk, the North Buckinghamshire Way, Round Aylesbury Walk and Midshires Way. The Proposed Scheme crosses PRoW in 13 locations. In addition to the 13 PRoW, the Proposed Scheme crosses four roads with potential for use by non-motorised users.
- 7.7.8 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.7.9 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2 (CFA Report 21)
- 7.7.10 In this study area the Proposed Scheme will leave the Dunsmore, Wendover and Halton area (CFA10) on the Stoke Mandeville south embankment. The route will then descend into the Aylesbury south cutting. This section of the Proposed Scheme extends from just north of Nash Lee Road to north of the Princes Risborough to Aylesbury Line on the south-western edge of Aylesbury. Key permanent features of this section will include an underbridge just west of the A4010 Risborough Road providing a realignment of non-motorised user access to Stoke Mandeville and an overbridge west of Stoke Mandeville providing a realignment of farm access, Footpath SMA/8 and Footpath SMA/9. Marsh Lane will be permanently stopped-up on either side of the Proposed Scheme but access to local properties, including Brook Farm and Moat Farm will be maintained. An overbridge will be situated west of Stoke Mandeville providing a new bypass for Stoke Mandeville and a realignment of Footpath SMA/11. A new highway scheme, the Stoke Mandeville bypass, will be provided leaving A4010 Risborough Road to the west of the Proposed Scheme, continuing west of the Proposed Scheme and parallel to it in a northerly direction, crossing the Proposed Scheme over the aforementioned overbridge and linking to the B4443 Lower Road to the east of the Proposed Scheme. An overbridge west of Stoke Mandeville providing a realignment of the Princes Risborough to Aylesbury Line and a further overbridge will provide a realignment of farm access and Footpath SMA/16.
- 7.7.11 The Princes Risborough to Aylesbury Line runs broadly east-west, crossing the Proposed Scheme to the south-west of Aylesbury. It will be realigned in which it will commence just south of the Marsh Lane level crossing, cross over the Proposed Scheme on an overbridge and rejoin the current alignment on the outskirts of Aylesbury. A key permanent feature of this section will include an overbridge west of Stoke Mandeville to carry the Princes Risborough to Aylesbury Line over the Proposed Scheme. There will be two level crossing of the Princes Risborough to Aylesbury Line
- 7.7.12 The Proposed Scheme will continue into the Aylesbury south embankment and Aylesbury north cutting section. This section extends from Bridleway SBH/19 to Aylesbury Park Golf Club to the west of Aylesbury. Key permanent features of this section will include five overbridges west of Aylesbury

- 7.7.13 The Proposed Scheme will continue into the Thame Valley viaduct and adjacent earthworks section running from the Aylesbury Park Golf Club, west of Aylesbury, to north of the River Thame. Key permanent features of this section will include an overbridge north of Aylesbury Park Golf Club, providing a realignment of Footpath SBH/2. There will be a viaduct to carry the Proposed Scheme over the River Thame before a second overbridge west of Putlowes, providing realigned farm access.
- 7.7.14 The Proposed Scheme will continue onto the Bicester Road embankment. The embankment extends from north of the River Thame to just south of the A41 Bicester Road to the east of Waddesdon. A key permanent feature of this section will include an overbridge west of Fleet Marston, providing a realignment of farm access and Bridleways FMA/1 and FMA/2.

Stoke Mandeville and Aylesbury (CFA11) assessment methodology

- 7.7.15 Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The factors have been derived for the individual road types and relevant wards. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday.
- 7.7.16 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading. As a consequence, local transport impacts may be over-estimated.
- 7.7.17 The link capacities of roads within the study area have been analysed to identify any that are likely to experience traffic congestion in the future baseline, without the Proposed Scheme. The Proposed Scheme will result in additional traffic on roads during construction and operation and therefore link capacities have been assessed for 2021 (construction) and 2026 and 2041 (operation).
- 7.7.18 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021, 2026 and 2041 baselines have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Stoke Mandeville and Aylesbury (CFA11) future baseline

Key future baseline issues

- 7.7.19 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 14%-19%;
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 24%-32%; and
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 48%-66%.
- 7.7.20 As a result of this analysis, the roads subject to assessment within the study area which will potentially experience peak period intermittent traffic congestion and delay in the 2021 future baseline situation, without Proposed Scheme traffic, are listed below. Due to higher forecast baseline traffic flows in 2026 and 2041, these roads will potentially experience a higher level of peak period intermittent traffic congestion and delay during these assessment years, without Proposed Scheme traffic.
- A4010 Risborough Road (between Little Kimble and Stoke Mandeville);
 - B4443 Lower Road (between Aylesbury and Stoke Mandeville);
 - A413 Wendover Road (between junction with A4010 and A41y); and
 - A418 Oxford Road (south west of A41 in Aylesbury).
- 7.7.21 As a result of this analysis, none of the roads subject to assessment, other than those listed above, are expected to experience substantial traffic congestion and delay in the 2026 and 2041 future baseline situation, without Proposed Scheme traffic.
- 7.7.22 There are no other key future baseline issues identified within the study area.

Land use assumptions

- 7.7.23 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional localised traffic growth not accounted for by the growth factors previously described.
- 7.7.24 Within the study area, there are no committed developments which are considered to require adjustment to the SPD quantums within TEMPRO, which already account for future development in the study area.

7.7.25 The TEMPRO growth factors used in the study area are shown in Table 7-74.

Table 7-74: Stoke Mandeville and Aylesbury summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	14%	24%	48%
Maximum	19%	32%	66%
Average	16-17%	27-29%	56-60%

Transport growth assumptions

- 7.7.26 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.
- 7.7.27 The Stoke Mandeville bypass will result in the permanent closure of roads within the study area during the operational years of 2026 and 2041. However, as the bypass is being constructed in relation to and as a direct result of the Proposed Scheme, 2026 and 2041 baseline flows on roads affected by the bypass remain as they would without the bypass. The forecast change in road network flows in relation to the bypass have been assigned during the 'with Proposed Scheme' assessment only.
- 7.7.28 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area

Strategic and local road network traffic flows

- 7.7.29 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are A41 Bicester Road, A413 Wendover Road/Nash Lee Road, A4010 Risborough Road/Station Road, A418 Aylesbury Road/Oxford Road, A4157 Weedon Road/Elmhurst Road, B4009 Nash Lee Road, B4443 Lower Road, Old Risborough Road, Marsh Lane and Nash Lee Lane.
- 7.7.30 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B(iii)

- 7.7.31 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.7.32 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area, are presented in Table 7-75 and Table 7-76 for AM peak and PM peak flows respectively.
- 7.7.33 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-77 and Table 7-79 for AM peak and PM peak flows respectively.

Table 7-78 Accidents and safety

- 7.7.34 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-75: Stoke Mandeville and Aylesbury strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A4010 Aylesbury Road/Risborough Road (Little Kimble)	EB	679	7	794	8	872	9	1282	12	115	193	603	17%	28%	63%
	WB	767	8	896	10	985	11	1142	13	129	218	375	17%	28%	63%
A4010 Risborough Road (Stoke Mandeville)	NB	724	27	839	31	918	34	1280	43	115	194	556	16%	27%	60%
	SB	844	28	978	32	1071	35	1769	45	134	227	925	16%	27%	60%
A4010 Station Road (Stoke Mandeville)	NB	727	12	838	14	914	15	1683	19	111	187	956	15%	26%	57%
	SB	815	20	940	23	1025	25	1077	31	125	210	262	15%	26%	57%
A418 Oxford Road (Aylesbury)	NB	1107	66	1283	76	1404	84	689	105	176	297	-418	16%	27%	60%
	SB	964	34	1117	40	1223	43	1230	55	153	259	266	16%	27%	60%
A413 Wendover Road (Stoke Mandeville)	EB	1138	12	1319	14	1444	15	1093	19	181	306	-45	16%	27%	60%
	WB	1053	16	1220	19	1336	21	583	26	167	283	-470	16%	27%	60%
A418 Bierton Rd/Aylesbury Rd (Aylesbury)	EB	674	11	781	13	855	14	584	18	107	181	-90	16%	27%	60%
	WB	431	9	499	10	547	11	1282	14	68	116	851	16%	27%	60%
A4157 Elmhurst Rd (Aylesbury)	EB	770	68	892	79	977	86	1142	109	122	207	372	16%	27%	60%
	WB	684	26	793	30	868	32	1280	41	109	184	596	16%	27%	60%
A4157 Weedon Rd (Aylesbury)	EB	365	11	423	13	463	14	1769	18	58	98	1404	16%	27%	60%
	WB	365	12	423	14	464	16	1541	20	58	99	1176	16%	27%	60%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
B4443 Lower Road (Stoke Mandeville)	NB	850	16	980	18	1070	20	1541	25	130	220	691	15%	26%	59%
	SB	807	18	931	21	1016	23	1820	29	124	209	1013	15%	26%	59%

Table 7-76: Stoke Mandeville and Aylesbury strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A4010 Aylesbury Road/Risborough Road (Little Kimble)	EB	582	2	688	2	760	2	982	3	106	178	400	18%	30%	69%
	WB	467	2	552	3	610	3	788	4	85	143	321	18%	30%	69%
A4010 Risborough Road (Stoke Mandeville)	NB	947	16	1104	18	1213	20	1548	26	157	266	601	17%	28%	63%
	SB	685	7	799	9	878	10	1120	12	114	193	435	17%	28%	63%
A4010 Station Road (Stoke Mandeville)	NB	650	3	754	3	826	4	1044	5	104	176	394	16%	27%	61%
	SB	693	5	804	6	880	6	1113	8	111	187	420	16%	27%	61%
A418 Oxford Road (Aylesbury)	NB	901	15	1051	17	1155	19	1473	24	150	254	572	17%	28%	63%
	SB	1168	13	1362	15	1497	17	1909	22	194	329	741	17%	28%	63%
A413 Wendover Road (Stoke Mandeville)	EB	806	2	940	3	1033	3	1318	4	134	227	512	17%	28%	63%
	WB	1291	14	1505	16	1654	18	2110	23	214	363	819	17%	28%	63%
A418 Bierton	EB	798	7	930	8	1022	8	1304	11	132	224	506	17%	28%	63%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Rd/Aylesbury Rd (Aylesbury)	WB	318	2	371	2	407	2	520	3	53	89	202	17%	28%	63%
A4157 Elmhurst Rd (Aylesbury)	EB	649	54	756	63	831	69	1060	88	107	182	411	17%	28%	63%
	WB	520	24	606	28	666	31	850	39	86	146	330	17%	28%	63%
A4157 Weedon Rd (Aylesbury)	EB	618	10	720	11	791	13	1009	16	102	173	391	17%	28%	63%
	WB	391	4	456	4	501	5	639	6	65	110	248	17%	28%	63%
B4443 Lower Road (Stoke Mandeville)	NB	963	11	1117	13	1224	14	1564	18	154	261	601	16%	27%	62%
	SB	775	7	899	8	985	9	1259	11	124	210	484	16%	27%	62%

Table 7-77: Stoke Mandeville and Aylesbury local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Old Risborough Road (Stoke Mandeville)	NB	5	1	6	1	6	1	8	2	1	1	3	16%	27%	60%
	SB	5	1	6	1	6	1	8	2	1	1	3	16%	27%	60%
Marsh Lane (Stoke Mandeville)	NB	96	0	112	0	122	0	154	0	16	26	58	16%	27%	60%
	SB	112	0	130	0	142	0	178	0	18	30	66	16%	27%	60%

Table 7-78: Stoke Mandeville and Aylesbury local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Old Risborough Road (Stoke Mandeville)	NB	11	1	13	1	14	1	18	2	2	3	7	17%	28%	63%
	SB	8	0	9	0	10	0	13	0	1	2	5	17%	28%	63%
Marsh Lane (Stoke Mandeville)	NB	95	0	111	0	122	0	155	0	16	27	60	17%	28%	63%
	SB	90	0	105	0	115	1	147	1	15	25	57	17%	28%	63%

Stoke Mandeville and Aylesbury (CFA11) Proposed Scheme construction description

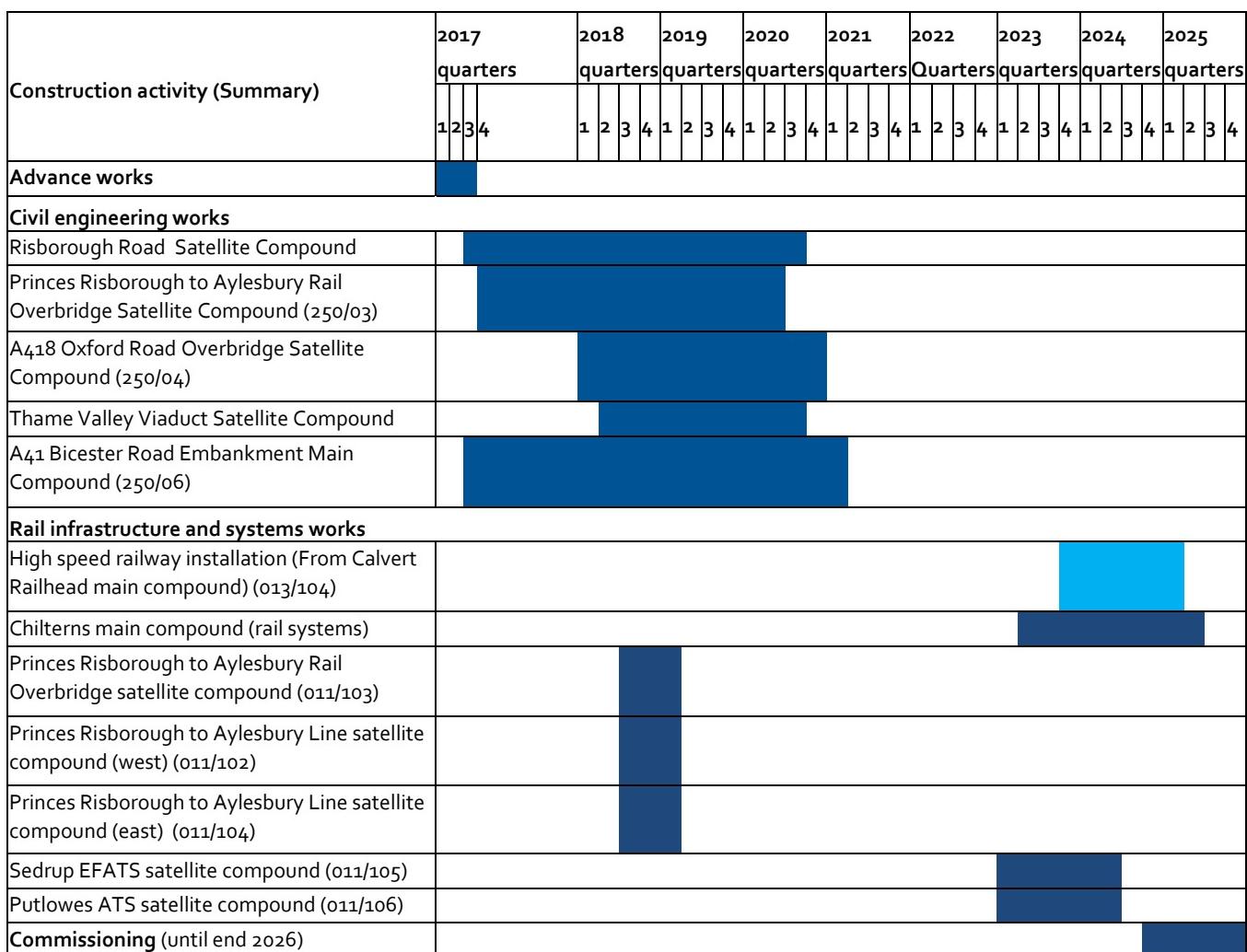
Construction activities

7.7.35 The major construction elements within the study area are as follows:

- Stoke Mandeville south embankment and Aylesbury south cutting;
- Princes Risborough to Aylesbury rail overbridge;
- Aylesbury south embankment and Aylesbury north cutting;
- Thame Valley viaduct and adjacent earthworks; and
- Bicester Road embankment.

7.7.36 Details of the construction phasing are provided in Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-8.

Figure 7-8: Stoke Mandeville and Aylesbury construction activity phasing



Compounds and construction sites

- 7.7.37 Main site compounds will be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds will generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.7.38 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-79. There are no compounds within the study area with shift working (24 hours).
- 7.7.39 The location of compounds are shown on Maps CT-05-04ob to CT-05-043-L1 (Volume 2, Map Book 11).

Table 7-79: Stoke Mandeville and Aylesbury assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration the construction programme	
		Average	Peak
Satellite	Risborough Road	67	154
Satellite	Princes Risborough to Aylesbury rail overbridge	56	129
Satellite	Princes Risborough to Aylesbury rail overbridge (west) (rail systems)	19	24
Satellite	Princes Risborough to Aylesbury rail overbridge (east) (rail systems)	19	24
Satellite	A418 Oxford Road overbridge and Sedrup express feeder auto-transformer station	53	186
Satellite	Thame Valley viaduct	53	148
Main	A41 Bicester Road Embankment/Putlowes auto-transformer station	56	96

Construction trip assumptions

Trip generation

7.7.40 The duration of when there will be busy transport activity at each site is shown in Table 7-80. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-80: Stoke Mandeville and Aylesbury typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity				
						Cars/ Light goods vehicles (LGV)	HGV			
Satellite	Risborough Road	A4010 Risborough Road, A4129, A418 Thame Road and/or A4010 Risborough Road, B4009	2017	Three years	19 months	150-200	10-20			
Satellite	Princes Risborough to Aylesbury rail overbridge	Haul road from A418 Oxford Road via A41	2017	Two years and six months	Eight months	100-120	10-20			
Satellite	Princes Risborough to Aylesbury rail overbridge (west) (rail systems)	Via the Princes Risborough to Aylesbury railway line or the Princes Risborough to Aylesbury rail overbridge satellite compound	2018	Nine months						
Satellite	Princes Risborough to Aylesbury rail overbridge (east) (rail systems)	Via the Princes Risborough to Aylesbury railway line								
Satellite	A418 Oxford Road overbridge and Sedrup express feeder auto-	A418 Oxford Road, A4146, A421 and/or A418 Oxford Road to Aylesbury, A41 Bicester Road and/or A418	2018	Six years and three months	13 months	10-20	710-730			

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ Light goods vehicles (LGV)	HGV
	transformer station	Oxford Road/Aylesbury Road/Thame Road					
Satellite	Thame Valley viaduct	Haul road from A41 Bicester Road, A418 Oxford Road/Aylesbury Road, A4146, A421	2018	Two years and three months	21 months	110-160	40-50
Main	A41 Bicester Road Embankment/Putl owes auto-transformer station	A41 Bicester Road	2017	Seven years	22 months	190-260	10-20

- 7.7.41 Information on the indicative construction programme is provided in Figure 7-8, which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-8o. Consequently the peak traffic movements presented will not generally occur at the same time, although in some instances there may be some overlap.
- 7.7.42 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment

7.7.43 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been

used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;

- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network; and
- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

- 7.7.44 Within the study area, mass-haul movements have been assigned to A418 (between the Proposed Scheme and A41 in Aylesbury) and A41 (between A418 and boundary with CFA11).
- 7.7.45 Within the study area, construction traffic and workforce traffic has been assigned to the roads listed in the construction lorry routes section below.
- 7.7.46 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.
- 7.7.47 From the neighbouring areas to the north, including Waddesdon and Quainton (CFA12) and Calvert, Steeple Claydon, Twyford and Chetwode (CFA 13) areas, cumulative average construction traffic flows of approximately 60 cars/LGVs and 20 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to the A41.
- 7.7.48 From the neighbouring areas to the south, including Dunsmore, Wendover and Halton (CFA10), Central Chilterns (CAF9) and The Chalfonts and Amersham (CFA8) areas, cumulative average construction traffic flows of approximately 230 cars/LGVs per day and no HGVs have been included in the assessment for this area. These flows have been assigned to the A4010 Risborough Road (Stoke Mandeville and Little Kimble) and A413 (workforce traffic only).

Construction lorry routes

- 7.7.49 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Map TR-03-055 (Volume 5, Map Book 71):
- Risborough Road satellite compound will be accessed via A4010 Risborough Road, A4129, A418 Thame Road and/or A4010 Risborough Road, B4009;
 - Princes Risborough to Aylesbury rail overbridge satellite compound will be accessed via haul road from A418 Oxford Road via A41;
 - Princes Risborough to Aylesbury rail overbridge (west) (rail systems) satellite

compound will be accessed via the Princes Risborough to Aylesbury railway line or the Princes Risborough to Aylesbury rail overbridge satellite compound;

- Princes Risborough to Aylesbury rail overbridge (east) (rail systems) satellite compound will be accessed via the Princes Risborough to Aylesbury railway line;
- A418 Oxford Road overbridge and Sedrup express feeder auto-transformer station compound will be accessed via A418 Oxford Road, A4146, A421 and/or A418 Oxford Road to Aylesbury, A41 Bicester Road and or/A418 Oxford Road/Aylesbury Road/Thame Road;
- Thame Valley viaduct satellite compound will be accessed via haul road from A41 Bicester Road, A418 Oxford Road/Aylesbury Road, A4146, A421; and
- A41 Bicester Road Embankment/Putlowes auto-transformer station main site compound will be accessed via A41 Bicester Road.

Traffic management, road closures and diversions

7.7.50 The A418 Oxford Road is to be realigned; however construction of the new road will be carried out 'off-line', meaning that the existing road will remain open with no diversion of traffic required until the new off-line section of road is complete. Traffic management and/or very short term closures i.e. overnight, off-peak or weekend, may be required to tie the new off-line section of road into the existing road immediately before switchover, although these are not considered to have a substantial impact upon motorised users.

7.7.51 The A4010 Risborough Road, Old Risborough Road and Marsh Lane, which will be permanently closed following construction of the Stoke Mandeville bypass, will remain open during the construction of the Proposed Scheme.

7.7.52 The roads in the study area that will experience permanent closure are listed below and reported on in the operational scheme section of this report:

- A4010 Risborough Road where it intersects with the Proposed Scheme;
- Old Risborough Road where it intersects with the Proposed Scheme; and
- Marsh lane, between the Proposed Scheme and the Stoke Mandeville bypass.

PRoW closures and diversions

7.7.53 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-81.

7.7.54 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.

7.7.55 Temporary closures and diversions of PRoW during construction are shown Maps CT-05-040b to CT-05-043-L1 (Volume 2, Map Book 11).

Table 7-81: Stoke Mandeville and Aylesbury temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
ELL/20 (public footpath)	Wendover	56+800	June 2018	100m Up to nine months	Construction of Footpath ELL/20 overbridge Temporary diversion to the east of the new overbridge.
ELL/2 (public footpath)	Stoke Mandeville	57+800	Oct 2017	400m Up to two years	Construction of Stoke Mandeville Bypass Temporary diversion of footpath between ELL/2 (public footpath), ELL/8/1 and North Lee Lane to suit construction phasing.
ELL/8 (public footpath)	Stoke Mandeville	57+800	Oct 2017	400m Up to two years	Construction of Stoke Mandeville Bypass Temporary diversion of footpath between ELL/2 (public footpath), ELL/8/1 and North Lee Lane to suit construction phasing.
Public Footpath SMA/8/2	Stoke Mandeville	58+100	March 2018	550m Up to nine months	Construction of Footpath SMA/9 Accommodation overbridge Temporary diversion to the south of the Proposed Scheme trace construction.
SMA/9 (public footpath)	Stoke Mandeville	58+400	March 2018	100m Up to nine months	Construction of Footpath SMA/9 Accommodation overbridge Temporary diversion to the west of the existing route.
Public Footpath SMA/11/2	Stoke Mandeville	059+250 - 059+300	Oct 2017	600m Up to two years	Construction of Stoke Mandeville Bypass Temporary diversion to the east of existing alignment before diverting footpath across new A4010 Stoke Mandeville bypass overbridge.
SMA/16/2 (public footpath) - Round Aylesbury Walk	Aylesbury	059+600	Oct 2017	Temporary closure of PRoW Up to one year and six months	Construction of Princes Risborough to Aylesbury Rail Overbridge Temporary closure of PRoW between 059+300 and 060+000 until construction of new Princes Risborough to Aylesbury Rail overbridge is completed.
SMA/16/3 (public footpath) - Round Aylesbury Walk (2)	Aylesbury	059+600	Oct 2017	Temporary closure of PRoW Up to one year and six months	Construction of Princes Risborough to Aylesbury Rail Overbridge Temporary closure of PRoW between 059+300 and 060+000 until construction of new Princes Risborough to Aylesbury Rail overbridge is completed.
SBH/19/7 (public footpath)	Aylesbury	060+550	Apr 2018	100m Up to nine months	Construction of SBH/19 Bridleway Overbridge Temporary diversion to the east of the existing route during construction of the

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
					overbridge.
SBH/27 (public footpath)	Aylesbury	061+200	Oct 2018	100m Up to nine months	Construction of SBH/27 Overbridge Temporary diversion to the west of the existing route during construction of the overbridge.
SBH/34 (public footpath)	Aylesbury	061+780	July 2018	100m Up to nine months	Construction of SBH/34 accommodation Overbridge Temporary diversion to the east of the existing route during construction of the overbridge.
SBH/32 (public footpath)	Aylesbury	062+750	July 2018	100m Up to nine months	Construction of SBH/32 overbridge Temporary diversion to the west of the existing route during construction of the overbridge.

7.7.56 The following PRoW will be temporarily diverted by a negligible distance during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:

- SBH/2/4 (public bridleway);
- Putlowes Farm Access;
- FMA/1 (public footpath); and
- FMA/2 (public footpath).

7.7.57 The following PRoW are likely to remain open during construction of the Proposed Scheme and are therefore not considered to be impacted:

- Risborough Road;
- Old Risborough Road;
- Marsh Lane;
- SMA/16 (public footpath); and
- A418 Oxford Road.

7.7.58 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:

- SMA/5 (public footpath);
- Old Risborough Road;

- SMA/8 (public footpath);
- Marsh Lane;
- SMA/11 (public footpath);
- SMA/16 (public footpath);
- A418 Oxford Road;
- FMA/1 (public footpath); and
- FMA/2 (public footpath).

Utilities works

7.7.59 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area.

7.7.60 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Roads within the study area which will be affected by utility works are:

- A4010 Risborough Road;
- A418 Oxford Road; and
- A41 Bicester Road.

Avoidance and mitigation measures

7.7.61 The following measures have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce impacts on transport users:

- transporting construction materials and equipment along haul roads adjacent to the route of the Proposed Scheme where reasonably practicable to reduce lorry movements on the public highway;
- the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in reduced diversions of traffic onto alternative routes;

- provision of temporary alternative routes and/or building structures early to maintain connectivity for PRoW closed during construction to minimise loss of amenity;
- HGV routeing as far as reasonably practicable along the strategic road network, and using designated access roads, as shown in Map TR-03-055 (Volume 5, Traffic and Transport Map Book);
- the need for rail possessions will be managed so that these take place for limited durations overnight and at weekends; and
- reducing daily travel by site workers by providing on site accommodation and welfare.

- 7.7.62 The draft CoCP (see Volume 5: Appendix CT-003-000/1) will include measures which seek to reduce the impacts of deliveries of construction materials and equipment, including construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.
- 7.7.63 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an overarching framework travel plan⁵ that will require travel plans to be used, along with a range of potential measures, to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. This will encourage the use of sustainable modes of transport or vehicle sharing.
- 7.7.64 The reductions in traffic generation arising from the Travel Plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.
- 7.7.65 The measures in the draft CoCP (Section 14.2) will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impacts of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.
- 7.7.66 Specific measures will include:
- the core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will, therefore, generally arrive before the morning peak hour and depart after the evening peak hour (although the

⁵ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

assessment has assumed that some of work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario (draft CoCP, Section 5); and

- excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 14).

7.7.67 Rail replacement services will be provided when rail possessions are in place on the Princes Risborough to Aylesbury Line and the Marylebone to Aylesbury Line. Where practicable rail possessions will be scheduled to coincide with other planned rail possessions for engineering and maintenance works on the same line to minimise additional disruption to rail users.

7.7.68 No other mitigation measures during construction of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Stoke Mandeville and Aylesbury (CFA11) construction impacts

Key construction transport issues

7.7.69 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.

- construction vehicle movements to and from the construction site compounds;
- temporary road closures and associated diversions of motorised users;
- temporary PRoW closures and associated diversions of non-motorised users; and
- short-term possessions of the Princes Risborough to Aylesbury Line and potential possessions of the Marylebone to Aylesbury Line.

7.7.70 No substantial traffic and transport impacts are expected on waterways and canals, public transport interchanges, parking and loading, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

7.7.71 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.

7.7.72 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-82 and Table 7-83 for AM peak and PM peak flows respectively.

Table 7-82: Stoke Mandeville and Aylesbury strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A4010 Aylesbury Road/Risborough Road (Little Kimble)	EB	679	794	930	31	136	22	17%	266%
	WB	767	896	929	32	32	22	4%	234%
A4010 Risborough Road (Stoke Mandeville)	NB	724	839	983	32	144	1	17%	4%
	SB	844	978	1142	33	163	1	17%	4%
A418 Oxford Road (north west of Proposed Scheme alignment)	NB	1107	1283	1371	124	88	48	7%	62%
	SB	964	1117	1192	87	75	48	7%	120%
A418 Bierton Rd/Aylesbury Rd	NB	674	781	798	15	17	2	2%	16%
	SB	431	499	538	12	38	2	8%	20%
A4157 Weedon Rd	EB	365	423	454	15	31	2	7%	16%
	WB	365	423	431	16	7	2	2%	14%

Table 7-83: Stoke Mandeville and Aylesbury strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A4010 Aylesbury Road/Risborough Road (Little Kimble)	EB	582	688	1019	10	13	7	1%	333%
	WB	467	552	779	10	111	7	17%	275%
A4010 Risborough Road (Stoke Mandeville)	NB	947	1104	1252	19	148	1	13%	3%
	SB	685	799	938	9	139	1	17%	9%
A418 Oxford Road (north west of Proposed Scheme alignment)	NB	901	1051	1123	63	72	46	7%	271%
	SB	1168	1362	1446	62	84	46	6%	298%
A418 Bierton Rd/Aylesbury Rd	NB	798	930	965	8	35	1	4%	9%
	SB	318	371	385	3	14	1	4%	37%
A4157 Weedon Rd	EB	618	720	725	12	5	1	1%	6%
	WB	391	456	484	5	28	1	6%	16%

7.7.73 There are no local road network links in the study area where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more during construction of the Proposed Scheme.

- 7.7.74 There are no roads in the study area on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users.
- 7.7.75 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- A418, between the Proposed Scheme and A41, in Aylesbury; and
 - A41, between the A418 and the boundary with CFA11.
- 7.7.76 The HGVs used for the transportation of construction materials and equipment, along with workforce traffic, will use designated lorry routes as described in Section 7.7.49. Some of these roads may also have an increase in other Proposed Scheme traffic.
- 7.7.77 The implementation of the draft CoCP (see Volume 5: Annex CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

Junction performance

- 7.7.78 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.
- 7.7.79 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:
- A41 with Aylesbury Way Parkway;
 - A41 with Jackson Rd and Dickins Way;
 - A41 with Rabans Lane;
 - A41 with Meadowcroft;
 - A41 with Broadfields;
 - A418 Oxford Rd with Coldharbour Way;
 - A418 Oxford Rd with Ellen Road;
 - A41 with Griffin Lane;
 - A418 Oxford Rd with Churchill Avenue and Fowler Road;
 - A41 Bicester Road with A4157 Weedon Road and A41 Gatehouse Road; and

- A418 Oxford Road with A41 Gatehouse Road and A41 Friarage Road.

7.7.80 A qualitative assessment has been carried out for all the junctions above, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows(including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.

7.7.81 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the following junctions during peak periods:

- A41 with Aylesbury Way Parkway;
- A41 with Jackson Rd with Dickins Way;
- A41 with Rabans Lane;
- A41 with Meadowcroft;
- A41 with Broadfields;
- A41 with Griffin Lane; and
- A41 Bicester Road with A4157 Weedon Road and A41 Gatehouse Road.

7.7.82 The assessment indicates that increased traffic during the most intensive periods of construction has a high potential to cause additional intermittent traffic congestion and delay at the following junctions during peak periods:

- A418 Oxford Rd with Coldharbour Way;
- A418 Oxford Rd with Ellen Road;
- A418 Oxford Rd with Churchill Avenue and Fowler Road; and
- A418 Oxford Road with A41 Gatehouse Road and A41 Friarage Road.

Accidents and safety

7.7.83 The proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Rail

7.7.84 The Princes Risborough to Aylesbury Line is a rural branch line from Princes Risborough to Aylesbury, operated by Chiltern Railways. A frequent service is provided with two passenger trains during peak hours. Services run seven days a week. The line is also regularly used by freight services carrying waste from London to Calvert.

- 7.7.85 Within the study area the Princes Risborough to Aylesbury Line serves Monks Risborough, Little Kimble and Aylesbury stations.
- 7.7.86 The construction of the Proposed Scheme in this study area will require temporary possessions on the Princes Risborough to Aylesbury Line for the construction of the Princes Risborough to Aylesbury Line overbridge. Table 7-84 summarises the possessions which are forecast to be required.

Table 7-84: Stoke Mandeville and Aylesbury summary of rail possessions required

Element name	Location (chainage)	Description of works	Number of possessions	Type	Duration	Year/Duration
Princes Risborough to Aylesbury Rail Overbridge	059+425	Civil engineering: Temporary Works & Deck Installation (54hr); Parapet Construction (27hr); and Concrete (27hr).	4	All line block	54hr possession	2018-2019
		Interface with Network Rail: (three 54 hour possessions)	2	All line block	27hr possession	

- 7.7.87 The Marylebone to Aylesbury Line is a 63km railway line between London and Aylesbury, operated by Chiltern Railways. A frequent service is provided with two to four passenger trains during peak hours and two per hour at other times during the day. Services run seven days a week.
- 7.7.88 Within the study area the Marylebone to Aylesbury Line serves Stoke Mandeville, Aylesbury and Aylesbury Vale Parkway stations.
- 7.7.89 The construction of the Proposed Scheme will not require temporary rail possessions on the Marylebone to Aylesbury Line in this area. However, there will be rail possessions further south on the line which will affect some users of passenger services stopping at stations in this area. The possessions will be short-term and generally take place during mid-week nights or at weekends. Therefore the impacts of these possessions on rail users in this area will not be substantial.

Pedestrians, cyclists and equestrians

- 7.7.90 The review of PRoW links indicates there will be additional walking distances on 10 routes due to temporary diversions, with two of these links requiring a diversion of more than 500m. Two PRoW will be temporarily stopped up during construction of the Proposed Scheme.
- 7.7.91 Table 7-85 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.7.92 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-04ob to CT-05-043-L1 (Volume 2, Map Book 11).

Table 7-85: Stoke Mandeville and Aylesbury summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
ELL/20 (public footpath)	Wendover	56+800	Construction of Footpath ELL/20 overbridge	Temporary diversion to the east of the new overbridge.	0	100m	1min
ELL/2 (public footpath)	Stoke Mandeville	57+800	Construction of Stoke Mandeville Bypass	Temporary diversion of footpath between ELL/2 (public footpath), ELL/8/1 and North Lee Lane to suit construction phasing.	No data available	400m	5min
ELL/8 (public footpath)	Stoke Mandeville	57+800	Construction of Stoke Mandeville Bypass	Temporary diversion of footpath between ELL/2 (public footpath), ELL/8/1 and North Lee Lane to suit construction phasing.	2	400m	5min
Public Footpath SMA/8/2	Stoke Mandeville	58+100	Construction of Footpath SMA/9 Accommodation overbridge	Temporary diversion to the south of the Proposed Scheme trace construction.	12	550m	7min
SMA/9 (public footpath)	Stoke Mandeville	58+400	Construction of Footpath SMA/9 Accommodation overbridge	Temporary diversion to the west of the existing route.	0	100m	1min
Public Footpath SMA/11/2	Stoke Mandeville	059+250 - 059+300	Construction of Stoke Mandeville Bypass	Temporary diversion to the east of existing alignment before diverting footpath across new A4010 Stoke Mandeville bypass overbridge.	0	600m	7min
SMA/16/2 (public footpath) - Round Aylesbury Walk	Aylesbury	059+600	Construction of Princes Risborough to Aylesbury Rail Overbridge	Temporary closure of PRoW between 059+300 and 060+000 until construction of new Princes Risborough to Aylesbury Rail overbridge is completed.	27	Temporary closure of PRoW	Temporary closure of PRoW
SMA/16/3 (public Footpath) - Round Aylesbury Walk	Aylesbury	059+600	Construction of Princes Risborough to Aylesbury Rail Overbridge	Temporary closure of PRoW between 059+300 and 060+000 until construction of new Princes Risborough to Aylesbury Rail overbridge is completed.	No data available	Temporary closure of PRoW	Temporary closure of PRoW
Public Footpath	Aylesbury	060+550	Construction of SBH/19 Bridleway	Temporary diversion to the east of the existing route during construction of the	35	100m	1min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
SBH/19/7			Overbridge	overbridge.			
SBH/27 (public footpath)	Aylesbury	061+200	Construction of SBH/27 Overbridge	Temporary diversion to the west of the existing route during construction of the overbridge.	19	100m	1min
SBH/34 (public footpath)	Aylesbury	061+780	Construction of SBH/34 accommodation Overbridge	Temporary diversion to the east of the existing route during construction of the overbridge.	7	100m	1min
SBH/32 (public footpath)	Aylesbury	062+750	Construction of SBH/32 overbridge	Temporary diversion to the west of the existing route during construction of the overbridge.	22	100m	1min

Stoke Mandeville and Aylesbury (CFA11) Proposed Scheme operation description

Operation trip assumptions

7.7.93 During operation of the Proposed Scheme, Stoke Mandeville bypass will result in the permanent closure of and change in traffic flows on roads within the study area. These are:

- A4010 Risborough Road, Stoke Mandeville: permanent closure where it crosses the Proposed Scheme. All traffic will be permanently diverted via Stoke Mandeville bypass and B4443 Lower Road;
- Old Risborough Road, Stoke Mandeville: permanent closure where it crosses the Proposed Scheme. All traffic will be permanently diverted via B4443 Lower Road, Stoke Mandeville bypass and A4010 Risborough Road to use the southern entrance for access and egress; and
- Marsh Lane, Stoke Mandeville: permanent closure between the Proposed Scheme and the Stoke Mandeville bypass. All traffic will be permanently diverted via Stoke Mandeville bypass and B4443 Lower Road to use the northern entrance for access and egress. Marsh Lane will remain open from west of Stoke Mandeville bypass and will be accessible from a new junction off Stoke Mandeville bypass.

7.7.94 The change in traffic flows as a result of this is discussed in the following section reporting on operation impacts.

- 7.7.95 It is forecast that there will be no further substantial changes in demand on existing transport infrastructure within the study area for 2026 and 2041.

Traffic management, road closures and diversions

- 7.7.96 Table 7-86 identifies the roads in the study area that will experience permanent closure, with associated diversions, as a result of Stoke Mandeville bypass.
- 7.7.97 A4010 Risborough Road (with between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A410 Station Road), Old Risborough Road and Marsh Lane (east of Stoke Mandeville bypass) will remain open during operation of the Proposed Scheme for local access to existing properties only.

Table 7-86: Stoke Mandeville and Aylesbury permanent road closures and diversions

Name	Location	Diversion route	Approximate length of diversions
A4010 Risborough Road (where it crosses the Proposed Scheme)	Stoke Mandeville	Diversion via Stoke Mandeville bypass and B4443 Lower Road	4.8km
Old Risborough Road (where it crosses the Proposed Scheme)	Stoke Mandeville	Diversion via B4443 Lower Road and Stoke Mandeville bypass	4.8km
Marsh Lane (between the Proposed Scheme and the Stoke Mandeville bypass)	Stoke Mandeville	Diversion via Stoke Mandeville bypass and B4443 Lower Road	3km

- 7.7.98 The permanent diversions will affect approximately 18,220 vehicles a day (12 hour 2021 base flow) on A4010 Risborough Road, approximately 150 vehicles a day on Old Risborough Road and approximately 2,010 vehicles a day on Marsh Lane. The impacts upon the road network as a result of these permanent closures are discussed in the following section reporting on operation impacts.

Avoidance and mitigation measures

- 7.7.99 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- roads crossing the Proposed Scheme retained in their current location, or where not, alternative routes provided e.g. Stoke Mandeville bypass; and
 - retaining PRoW crossing the Proposed Scheme, with localised substitutes kept to a minimum.
- 7.7.100 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Stoke Mandeville and Aylesbury (CFA11) operation impacts

- 7.7.101 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.

- 7.7.102 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.
- 7.7.103 Within the study area, Stoke Mandeville bypass will connect A4010 Risborough Road with B4443 Lower Road, to the south of Stoke Mandeville, and has been accounted for in the assessment years of 2026 and 2041.

Key operation transport issues

- 7.7.104 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.
- permanent road closures or realignments and associated diversions to motorised users;
 - permanent road closures and associated diversions of bus services; and
 - permanent realignment or closure of PRoW and associated diversions to non-motorised users.

- 7.7.105 No substantial traffic and transport impacts are expected on waterways and canals, rail services, public transport interchanges, parking and loading, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.7.106 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.
- 7.7.107 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.
- 7.7.108 Within the study area the impact of Stoke Mandeville bypass, which will result in permanent closure of and change in traffic flows on roads, has been accounted for during the 2026 and 2041 operational years of assessment accordingly.
- 7.7.109 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows for all roads within the study area, apart from those affected by the Stoke Mandeville bypass as discussed below, are expected to remain the same as the 2026 and 2041 future baseline traffic flows.

Strategic and local road network traffic flows 2026

- 7.7.110 Changes in traffic flows assigned to the road network within the study area, where considered to be impacted by Stoke Mandeville bypass and associated permanent road closures, are presented in Table 7-87 and Table 7-88 for AM peak and PM peak flows for the 2026 year of operation, respectively.

Table 7-87: Stoke Mandeville and Aylesbury strategic and local road network 2026 future baseline and With HS2 traffic (vehicles) – AM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A4010 Risborough Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road, Stoke Mandeville)	NB	918	35	0	-884	-34	-96%	-100%
	SB	1071	10	0	-1061	-35	-99%	-100%
B4443 Lower Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road, Stoke Mandeville)	NB	1070	752	4	-318	-16	-30%	-79%
	SB	1016	523	5	-493	-17	-49%	-77%
Old Risborough Road (southern access, Stoke Mandeville)	NB	6	12	1	+6	0	95%	0%
	SB	6	11	1	+5	0	79%	0%
Marsh Lane (east of Stoke Mandeville bypass, Stoke Mandeville)	NB	122	8	0	-114	0	-93%	-100%
	SB	142	2	0	-139	0	-98%	-100%

Table 7-88: Stoke Mandeville and Aylesbury strategic and local road network 2026 future baseline and With HS2 traffic (vehicles) – PM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A4010 Risborough Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road, Stoke Mandeville)	NB	1213	16	0	-1197	-20	-99%	-100%
	SB	878	28	0	-850	-10	-97%	-100%
B4443 Lower Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A410 Station Road, Stoke Mandeville)	NB	1224	622	2	-602	-12	-49%	-87%
	SB	985	727	7	-258	-1	-26%	-17%
Old Risborough Road (southern access, Stoke Mandeville)	NB	14	23	1	+9	0	64%	0%
	SB	10	22	0	+12	0	117%	0%
Marsh Lane (east of Stoke Mandeville bypass, Stoke Mandeville)	NB	122	4	0	-118	0	-97%	-100%
	SB	115	7	0	-109	-1	-94%	-100%

- 7.7.111 Traffic flows will decrease by up to 99% during peak hour periods on A4010 Risborough Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A410 Station Road) and Marsh Lane (east of Stoke Mandeville bypass). This will potentially have a beneficial impact upon non-motorised users with regard to crossing the highway. However, it will have an adverse impact upon motorised users who will be subject to an increased travel distance as a result of the permanent diversion, of up to 4.8km as worst case scenario.
- 7.7.112 Traffic flows on B443 Lower Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road) will decrease by up to 49% during peak periods, which will potentially have a beneficial impact upon non-motorised users with regard to the ease with which they can crossing the highway.
- 7.7.113 The closure of the northern access to Old Risborough Road will result in all traffic accessing and egressing via the southern access point. This will potentially have an adverse impact upon non-motorised users along the southern extent of the road, where traffic flows will increase by up to 117% during peak hour periods. However, there will potentially be a beneficial impact upon non-motorised users along the northern extent, where traffic flows are likely to decrease. As baseline flows are low, these impacts are not likely to be substantial. There will be an adverse impact upon motorised users which previously accessed Old Risborough Road from the northern access due to increased travel distance as a result of the permanent diversion to the southern access, via B4443 Lower Road and Stoke Mandeville bypass, of up to 4.8km as a worst case scenario.

Strategic and local road network traffic flows 2041

- 7.7.114 Changes in traffic flows assigned to the road network within the study area, where considered to be impacted by Stoke Mandeville bypass and associated permanent road closures, are presented in Table 7-89 and Table 7-90 for AM peak and PM peak flows for the 2041 year of operation, respectively.

Table 7-8g: Stoke Mandeville and Aylesbury strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – AM peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A4010 Risborough Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A410 Station Road, Stoke Mandeville)	NB	1157	35	0	-1122	-43	-97%	-100%
	SB	1349	10	0	-1339	-45	-99%	-100%
B4443 Lower Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road, Stoke Mandeville)	NB	1350	943	5	-407	-20	-30%	-79%
	SB	1282	655	7	-627	-22	-49%	-77%
Old Risborough Road (southern access, Stoke Mandeville)	NB	8	14	2	+6	0	75%	0%
	SB	8	13	2	+5	0	63%	0%
Marsh Lane (east of Stoke Mandeville bypass, Stoke Mandeville)	NB	154	8	0	-145	0	-95%	-100%
	SB	178	2	0	-176	0	-99%	-100%

Table 7-90: Stoke Mandeville and Aylesbury strategic and local road network 2041 future baseline and With HS2 traffic (vehicles) – PM peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A4010 Risborough Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road, Stoke Mandeville)	NB	1548	16	0	-1532	-26	-99%	-100%
	SB	1120	28	0	-1092	-12	-98%	-100%
B4443 Lower Road (between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road, Stoke Mandeville)	NB	1564	792	2	-771	-15	-49%	-87%
	SB	1259	927	9	-332	-2	-26%	-17%
Old Risborough Road (southern access, Stoke Mandeville)	NB	18	27	2	+9	0	50%	0%
	SB	13	25	0	+12	0	92%	0%
Marsh Lane (east of Stoke Mandeville bypass, Stoke Mandeville)	NB	155	4	0	-151	0	-97%	-100%
	SB	147	7	0	-140	-1	-95%	-100%

- 7.7.115 On the road links forecast to have a reduction in traffic flow, namely the A4010 Risborough Road (with between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road), B443 Lower Road (with between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road) and Marsh Lane (east of the bypass), the percentage change between 2041 baseline and 2041 baseline with Proposed Scheme flows is very similar to that reported for 2026. However, in some instances the change is slightly higher as a percentage in 2041, due to higher baseline flows in 2041 than 2026. Consequently, the impacts upon motorised and non-motorised users for 2041 year of assessment remain the same as reported for 2026.
- 7.7.116 On the road link forecast to have an increase in traffic flow, namely Old Risborough Road, the percentage change between the 2041 baseline and 2041 baseline with Proposed Scheme is again similar to that reported for 2026. However, the change is slightly lower as a percentage in 2041, due to higher baseline flows in 2041 than 2026. Consequently, the impacts upon motorised and non-motorised users for 2041 year of assessment remain the same as reported for 2026.

Junction performance

- 7.7.117 During operation of the Proposed Scheme, junctions have been subject to assessment whereby peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 2% or more due to the Proposed Scheme, on any arm of the junction. For operation of the Proposed Scheme, the assessment has been carried out for assessment year 2041, as it represents the worst case scenario whereby the baseline flows are higher than in assessment year 2026., and is therefore more robust.
- 7.7.118 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:
- A4010 Risborough Road with B4443 Lower Road and A4010 Station Road.
- 7.7.119 A qualitative assessment has been carried out for the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows(including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.

- 7.7.120 Traffic flows will decrease on A4010 Risborough Road (with between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road) from up to 1,071 vehicles to up to 28 vehicles during peak periods and B4443 Lower Road (with between Stoke Mandeville bypass and the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road) from up to 1,224 vehicles to up to 752 vehicles during peak periods. This may potentially cause a reduction in any intermittent traffic congestion and delay that would otherwise occur at the junction of A4010 Risborough Road with B4443 Lower Road and A4010 Station Road without the Proposed Scheme. This may give rise to a beneficial impact upon motorised users.

Accidents and safety

- 7.7.121 The Proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during operation.

Local bus and coach

- 7.7.122 The A4010 Risborough Road will be closed just south of Old Risborough Road, as part of the introduction of the Stoke Mandeville bypass. As a result, the Number 300 and 321 bus services will have to divert from the A4010 Risborough Road onto the Stoke Mandeville bypass, before navigating back into Stoke Mandeville via B4443 Lower Road to maintain provision for village bus stops. The overall length of the diversion will be approximately 5km, which accounts for bus services doubling back through Stoke Mandeville.
- 7.7.123 Table 7-91 summarises the additional travel distance and time expected to result from the diverted bus services. The approximate additional journey time from start to end of route as a result of diversions has been recorded based upon average speed of service and length of diversion.

Table 7-91: Stoke Mandeville and Aylesbury permanent local bus/coach diversions

Bus/Coach service	Impact	Combined Service Frequency (potential max per hour)	Diversion route	Approximate length of diversions	Approximate additional journey time (start to end of route)
Bus service No. 300	Stopping up of A410 Risborough Road, requiring a diversion of the bus service	Four	via the Stoke Mandeville bypass and B4443 Lower Road to maintain access to village bus stops.	5km	8 min
Bus service No. 321	Stopping up of A410 Risborough Road, requiring a diversion of the bus service	One	via the Stoke Mandeville bypass and B4443 Lower Road to maintain access to village bus stops.	5km	8 min

7.7.124 Bus service 112, operated by Z&S Buses, Monday to Friday at a frequency of one service per hour, currently travels along Marsh Lane, east of Stoke Mandeville bypass, and B4443 Lower Road to and from the Stoke Mandeville hospital ambulance stop. As a result of the permanent closure of Marsh Lane, east of Stoke Mandeville bypass, the service will be permanently diverted via Stoke Mandeville bypass and B4443 Lower Road. This will result in a reduction in journey length of approximately 0.2km and may benefit users of the service.

Pedestrians, cyclists and equestrians

- 7.7.125 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.
- 7.7.126 The review of PRoW links indicates that there will be additional walking distances on nine routes due to permanent realignments, with one of these realigned links requiring a diversion of more than 500m.
- 7.7.127 Table 7-92 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.7.128 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-04ob to CT-06-043-L1 (Volume 2, Map Book 11).

Table 7-92: Stoke Mandeville and Aylesbury summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
SMA/5 (public footpath)	Stoke Mandeville	57+350	Permanent diversion onto Risborough Road new underpass where footpath is intersected by Proposed Scheme.	16	400m	5 min
Old Risborough Road	Stoke Mandeville	57+850	Permanent diversion to new Risborough Road underpass.	22	500m	6 min
SMA/8 (public footpath)	Stoke Mandeville	58+100	Permanent diversion to share SMA/9/1 footbridge crossing of Proposed Scheme at 58+400.	12	400m	5 min

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
Marsh Lane	Stoke Mandeville	058+650	Permanent diversion to SMA/9 accommodation overbridge via SMA/15A/1 and ELL/1/1.	26	500m	6 min
SMA/11 (public footpath)	Stoke Mandeville	059+250 - 059+300	Permanent diversion via A4010 Stoke Mandeville Bypass.	0	400m	5 min
SMA/16 (public footpath)	Stoke Mandeville	60+050	Permanent diversion to Footpath SM/6 Accommodation overbridge at ch 59+950.	21	100m	1 min
A418 Oxford Road	Aylesbury	062+275	Permanent diversion across realigned A418 Oxford Road overbridge.	78	100m	1 min
FMA/1 (public footpath)	Aylesbury	066+500	New permanent crossing of Proposed Scheme at 66+800, combined with FMA/2 (public footpath) across Bridleway FMA/1 accommodation overbridge.	42	900m	11 min
FMA/2 (public footpath)	Aylesbury	067+050	New permanent crossing of Proposed Scheme at 66+800, combined with Bridleway FMA/1 accommodation overbridge.	0	200m	14 min

- 7.7.129 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

7.8 Waddesdon and Quainton (CFA12)

Waddesdon and Quainton (CFA12) Proposed Scheme description

- 7.8.2 The Proposed Scheme through the Waddesdon and Quainton area will be approximately 10km in length. It will commence just south of the A41 Bicester Road, near Fleet Marston, proceeding north-westwards, with Waddesdon to the south-west. It will pass through the southern edge of Quainton, near the Buckinghamshire Railway Centre, and will then run parallel to the Aylesbury Link railway crossing over the River Ray and passing Finemere Wood. The route will exit the area at the north-west corner of Sheephause Wood, to the south-east of Calvert.
- 7.8.3 Within the Calvert, Steeple Claydon, Twyford and Chetwode area (CFA13) to the north, the Calvert IMD will be located on land adjacent to the Proposed Scheme, north-east of the Bicester to Bletchley Line crossing, and the associated tracks will run west to east alongside the Bicester to Bletchley Line for approximately 3km, approximately 600m south of Steeple Claydon. It will be operational and accessible by rail at all times and capable of 24 hours operation seven days per week. The majority of materials and equipment required for maintenance of the Proposed Scheme during operation will be delivered to the IMD by rail. Consequently deliveries by road will be nominal in number, however the IMD will generate some traffic on the road network within this study area, during operation of the Proposed Scheme.
- 7.8.4 The study area is predominantly rural land, consisting of mixed agricultural land. The village of Waddesdon is 1km west of the Proposed Scheme, whilst it will pass through the southern edge of Quainton, 1.5km south of the village centre. Westcott and Edgcott are 1.5km from the Proposed Scheme.
- 7.8.5 The Waddesdon and Quainton study area includes the A41 Aylesbury Road/Akeman Road/High Street (Waddesdon)/Bicester Road and local roads that are affected by the Proposed Scheme. The Proposed Scheme crosses five roads within the study area.
- 7.8.6 The Aylesbury Link rail line passes through this area. It runs to the east of and parallel with the Proposed Scheme for approximately 8km, between the former Quainton Road station and the Bicester to Bletchley Line at Calvert. It operates as a freight only line.
- 7.8.7 PRoW within the area include the Aylesbury Ring, the North Buckinghamshire Way, the Bernwood Jubilee Way, the Midshires Way and Swan's Way. The Proposed Scheme crosses PRoW in 13 locations..
- 7.8.8 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).

- 7.8.9 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2 (CFA Report 21)
- 7.8.10 The Proposed Scheme will leave the Stoke Mandeville and Aylesbury area (CFA11) on an embankment and then continue past the existing A41 Bicester Road for. The A41 Bicester Road will be realigned to the north of its present alignment. The realigned road will run parallel and to the north-east of the Proposed Scheme between Hunters Farm and Wayside Farm. It will then cross over the Proposed Scheme, which will be in cutting, on an overbridge and run south westwards to rejoin the existing A41 Bicester Road. Key features of this section will include the removal of a length of the existing Blackgrove Road to the east of the route. The remaining land will be treated in such a way that will be consistent with its end-use. An overbridge will take the A41 Bicester Road over the Proposed Scheme and a T-junction will provide access to the existing A41 alignment past The Grand Lodge, providing local access.
- 7.8.11 The route will continue north-west in a cutting for approximately 1km from the A41 Bicester Road overbridge through farmland east of Waddesdon to the Waddesdon sewage treatment works.
- 7.8.12 The Proposed Scheme will continue north-west in a cutting. It will then continue onto embankment for approximately 1.2km to the Station Road overbridge to the west of the Buckinghamshire Railway Centre at Quainton. The route will proceed into a long cutting until it converges with the Aylesbury Link railway corridor. The two routes will then run parallel on an embankment. Key features of this section will include a Needles Farm accommodation overbridge to provide access to the land south of the Buckinghamshire Railway Centre. The closure of a section of Station Road on either side of the crossroads with Quainton Road and provision of a turning head for access to the Buckinghamshire Railway Centre for long vehicles. Another key feature is the removal of a length of the existing Fidlers Field Road to the east and west of the route, which will be replaced by the new road realignments
- 7.8.13 The Proposed Scheme will continue to run parallel to the Aylesbury Link railway on its west side. The Proposed Scheme will be at approximately the same level as the Aylesbury Link, on a series of embankments and cuttings. At the northern end of the section the route will run between the Calvert Landfill site, to the west, and Sheephouse Wood, to the east. Alongside Sheephouse Wood the Aylesbury Link railway will be realigned to the east. A single existing track of the Aylesbury Link railway will be realigned eastwards providing space for the addition of a second track in the future within NR boundaries.

Waddesdon and Quainton (CFA12) assessment methodology

- 7.8.14 The assessment methodology used is described in Section 5 and Section 7.2. Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The factors have been derived for the individual road types and relevant wards. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday.
- 7.8.15 Within the study area baseline traffic volumes also take specific account of the consented changes to the Greatmoor Energy from Waste facility.
- 7.8.16 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading. As a consequence, local transport impacts may be over-estimated.
- 7.8.17 The link capacities of roads within the study area have been analysed to understand if they would experience congestion in the future baseline, without the Proposed Scheme. Within the study area, link capacities have been assessed for roads affected by the Proposed Scheme during construction (2021 baseline) and operation (2026 and 2041 baselines).
- 7.8.18 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021, 2026 and 2041 baselines have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Waddesdon and Quainton (CFA12) future baseline

Key future baseline issues

- 7.8.19 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 15%-19%;
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 24%-32%; and
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 46%-66%.

- 7.8.20 As a result of this analysis, the only road subject to assessment within the study area which will potentially experience peak period intermittent traffic congestion and delay in the 2041 future baseline situation, without Proposed Scheme traffic, are listed below.
- A41 Aylesbury Road (between Bicester and Grendon Underwood).
- 7.8.21 The proposed future East West Rail Link will provide a strategic railway connection between East Anglia and Central, Southern and Western England. It is expected to be fully operational by 2019. East West Rail Link passenger services between Milton Keynes and Aylesbury are expected to commence operating on the upgraded Aylesbury Link alongside the Proposed Scheme from December 2017 with a service frequency of one train per hour in each direction. Once operational, these rail links may change the existing pattern of public transport use and modal share within the study area, although it is not possible to accurately forecast how existing services or modal shift may be impacted at present. Future operations at the Calvert Landfill site and potentially the Greatmoor Energy from Waste facility, may also result in an increase in freight trains using this section of line of up to six trains per day. Some of these may arrive and depart via the Bicester to Bletchley Line to north in the Calvert, Steeple Claydon, Twyford and Chetwold area (CFA 13).
- 7.8.22 There are no other key future baseline issues identified within the study area.

Land use assumptions

- 7.8.23 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional. The development specific to the study area which has been taken into account during assessment is detailed below.

Greatmoor Energy from Waste facility

- 7.8.24 Within the study area, baseline traffic volumes have been amended to take specific account of the consented changes to the Greatmoor Energy from Waste facility. These include the provision of direct road access to the facility from the A41 Akeman Road via a disused railway, which will substantially reduce the number of HGVs on country lanes in the vicinity of Calvert.
- 7.8.25 The TEMPRO growth factors used in the study area are shown in Table 7-93.

Table 7-93: Waddesdon and Quainton summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	14%	24%	46%
Maximum	19%	32%	66%
Average	17%	28%	56%

Transport growth assumptions

- 7.8.26 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.
- 7.8.27 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.

Strategic and local road network traffic flows

- 7.8.28 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are the A41, Aylesbury Road/Akeman Road/High Street (Waddesdon)/Bicester Road, Blackgrove Road, Station Road, Quainton Road, Perry Hill, Buckingham Road, Grendon Road, Fiddlers Field Road (also known as Snake Lane), Lee Road, Edgcott Road (also known as Shipton Lee Road), The Broadway (Grendon Underwood) and Lawn Hill.
- 7.8.29 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B(iii).
- 7.8.30 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.8.31 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area , are presented in Table 7-94 and Table 7-95 for AM peak and PM peak flows respectively.

- 7.8.32 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-96 and Table 7-97 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.8.33 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-94: Waddesdon and Quainton strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A41 (east of Blackgrove Road, Waddesdon)	EB	913	109	1058	126	1159	138	1460	174	145	246	547	16%	27%	60%
	WB	633	84	734	98	803	107	1012	135	101	170	379	16%	27%	60%
A41 (west of Blackgrove Road, Waddesdon)	EB	912	66	1045	76	1138	82	1405	102	133	226	493	15%	25%	54%
	WB	722	61	827	70	901	76	1112	94	105	179	390	15%	25%	54%
A41 Aylesbury Road (between Bicester and Grendon Underwood)	EB	912	66	1011	73	1083	78	1261	91	99	171	349	11%	19%	38%
	WB	722	61	801	68	858	72	998	84	79	136	276	11%	19%	38%

Table 7-95: Waddesdon and Quainton strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A41 (east of Blackgrove Road, Waddesdon)	EB	697	55	812	64	893	70	1139	89	115	196	442	17%	28%	63%
	WB	832	58	969	68	1065	75	1359	95	137	233	527	17%	28%	63%
A41 (west of Blackgrove Road, Waddesdon)	EB	767	26	886	30	969	33	1215	41	119	202	448	15%	26%	58%
	WB	756	22	873	25	955	28	1197	35	117	199	441	15%	26%	58%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A41 Aylesbury Road (between Bicester and Grendon Underwood)	EB	767	26	854	29	919	31	1084	37	87	152	317	11%	20%	41%
	WB	756	22	842	24	906	26	1068	31	86	150	312	11%	20%	41%

Table 7-96: Waddesdon and Quainton local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Blackgrove Road (Waddesdon)	NB	156	2	179	2	195	3	241	3	23	39	85	15%	25%	54%
	SB	252	2	289	3	314	3	387	4	37	62	135	15%	25%	54%
Waddesdon Hill (Waddesdon)	NB	155	8	178	9	194	10	239	12	23	39	84	15%	25%	54%
	SB	264	6	303	7	330	7	406	9	39	66	142	15%	25%	54%
Station Road (south west of Quainton Rd, Quainton)	NB	54	5	62	6	67	6	83	8	8	13	29	15%	25%	54%
	SB	93	6	107	7	116	7	143	9	14	23	50	15%	25%	54%
Quainton Road (Quainton)	NB	37	1	43	1	46	1	57	2	6	9	20	15%	25%	54%
	SB	99	0	114	0	124	0	153	0	15	25	54	15%	25%	54%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Station Road (north east of Quainton Rd, Quainton)	EB	64	1	74	1	80	1	99	2	10	16	35	15%	25%	54%
	WB	126	1	144	1	157	1	194	1	18	31	68	15%	25%	54%
Fidlers Field Lane (also known as Snake Lane, Quainton)	NB	30	0	34	0	37	0	45	0	4	7	15	15%	25%	54%
	SB	74	0	85	0	93	0	114	0	11	19	40	15%	25%	54%
Lawn Hill/Buckingham Road (Quainton)	EB	48	1	55	1	60	1	73	1	7	12	25	15%	25%	54%
	WB	27	1	31	1	34	1	41	2	4	7	14	15%	25%	54%
Lee Rd/Lower Street(Quainton)	EB	99	17	113	19	123	21	152	26	14	24	53	15%	25%	54%
	WB	97	7	111	8	121	9	149	11	14	24	52	15%	25%	54%
Grendon Rd/Buckingham Road (Edgcott)	NB	239	7	274	8	296	8	356	10	35	57	117	15%	24%	49%
	SB	89	5	102	6	110	6	132	7	13	21	43	15%	24%	49%
The Broadway (Grendon Underwood)	NB	109	5	125	6	134	6	162	7	16	25	53	15%	24%	49%
	SB	220	7	253	8	272	9	328	11	33	52	108	15%	24%	49%

Table 7-97: Waddesdon and Quainton local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Blackgrove Road (Waddesdon)	NB	302	1	350	1	382	1	479	1	48	80	177	16%	26%	58%
	SB	112	1	129	1	141	1	177	1	17	29	65	16%	26%	58%
Waddesdon Hill (Waddesdon)	NB	220	2	254	2	278	3	348	3	34	58	128	16%	26%	58%
	SB	129	2	149	2	163	3	204	3	20	34	75	16%	26%	58%
Station Road (south west of Quainton Rd, Quainton)	NB	85	2	98	2	107	3	135	3	13	22	50	16%	26%	58%
	SB	42	3	49	3	53	4	66	5	7	11	24	16%	26%	58%
Quainton Road (Quainton)	NB	48	0	56	0	61	1	77	1	8	13	29	16%	26%	58%
	SB	38	1	44	1	48	1	60	1	6	10	22	16%	26%	58%
Station Road (north east of Quainton Rd, Quainton)	EB	84	1	97	1	106	1	132	1	13	22	48	16%	26%	58%
	WB	52	0	60	0	66	0	82	0	8	14	30	16%	26%	58%
Fidlers Field Lane (also known as Snake Lane, Quainton)	NB	47	0	54	0	59	0	74	0	7	12	27	16%	26%	58%
	SB	27	0	31	0	34	0	42	0	4	7	15	16%	26%	58%
Lawn Hill /Buckingham Road (Quainton)	EB	32	1	37	1	41	1	51	1	5	9	19	16%	26%	58%
	WB	31	2	36	2	39	3	49	3	5	8	18	16%	26%	58%
Lee Rd/Lower Street (Quainton)	EB	63	3	73	4	80	4	100	5	10	17	37	16%	26%	58%
	WB	91	7	105	8	115	9	144	11	14	24	53	16%	26%	58%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Grendon Rd/Buckingham Road (Edgcott)	NB	83	1	96	1	104	1	127	1	13	21	44	15%	25%	53%
	SB	203	1	234	1	254	2	310	2	31	51	107	15%	25%	53%
The Broadway (Grendon Underwood)	NB	203	0	234	0	253	0	309	0	31	50	106	15%	25%	53%
	SB	82	0	95	0	103	0	126	1	13	21	44	15%	25%	53%

Rail

- 7.8.34 The proposed future East West Rail Link will provide a strategic railway connection between East Anglia and Central, Southern and Western England. It will use the Oxford to Bicester Line, a renovated section of the Bicester to Bletchley Line, and finally the Marston Vale Line from Bletchley to Bedford. It is expected to be fully operational by 2019.
- 7.8.35 East West Rail Link passenger services between Milton Keynes and Aylesbury are expected to commence operating on the upgraded Aylesbury Link alongside the Proposed Scheme from December 2017 with a service frequency of one train per hour in each direction. Future operations at the Calvert landfill site and potentially the Greatmoor Energy from Waste facility, may also result in an increase in freight trains using this section of line of up to six trains per day. Some of these may arrive and depart via the Bicester to Bletchley Line to north in the Calvert, Steeple Claydon, Twyford and Chetwold area (CFA 13).

Waddesdon and Quainton (CFA12) Proposed Scheme construction description

Construction activities

- 7.8.36 The major construction elements within the study area are as follows:
- A41 Bicester Road realignment and overbridge;
 - Waddesdon south and north cuttings;
 - Quainton south and Doddershall embankments; and
 - Grendon Underwood embankment and Woodlands cutting .
- 7.8.37 Details of the construction phasing are provided in Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-9

Figure 7-9: Waddesdon and Quainton construction activity phasing

Construction activity (Summary)	2017				2018				2019				2020				2021				2022				2023				2024				2025			
	quarters				quarters				quarters				quarters				quarters				quarters				quarters				quarters							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Advance works																																				
Advance works																																				
Civil engineering works																																				
A41 Bicester Road Embankment Main Compound (250/06)																																				
A41 Bicester Road Overbridge Satellite Compound (260/01)																																				
Station Road Overbridge Satellite Compound (260/02)																																				

Construction activity (Summary)	2017				2018				2019				2020				2021				2022				2023				2024			
	quarters				quarters				quarters				quarters				quarters				quarters				quarters				quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Woodlands Cutting Satellite Compound (260/03)																																
Rail infrastructure and systems works																																
High speed railway installation (From Calvert railhead main compound) (013/104)																																
Quainton ATFS satellite compound (012/101)																																
Commissioning																																
Commissioning (until end 2026)																																

Compounds and construction sites

- 7.8.38 Main site compounds would be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds would generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.8.39 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-98Table 7-79. There are no compounds within the study area with shift working (24 hours).
- 7.8.40 The location of compounds are shown on Maps CT-05-047b to CT-05-051-R4 (Volume 2, Map Book 12).

Table 7-98: Waddesdon and Quainton assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Satellite	A41 Bicester Road overbridge	52	130
Satellite	Station Road overbridge	45	96
Satellite	Woodlands Cutting/Quainton auto-transformer feeder station	74	208

Construction trip assumptions

Trip generation

- 7.8.41 Details of construction compounds along with planned construction routes are provided in Section 2. The duration of when there will be busy transport activity at each site is shown in Table 7-99. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-99: Waddesdon and Quainton typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Satellite	A41 Bicester Road overbridge	A41 Bicester Road	2017	Two years and nine months	16 months	10-20	370-380
Satellite	Station Road overbridge	Station Road, A41 Bicester Road and Station Road, A4146, A418, A41 Bicester Road	2017	Two years and nine months	16 month	150-200	10-20
Satellite	Woodlands Cutting/Quainton auto-transformer feeder station	A41 Bicester Road, The Broadway (Grendon Underwood), Edgott Road, Grendon Road, Buckingham Road, Lawn Hill/Edgott Road and A421, Gawcott Road, Buckingham road, Hillesden Road, Perry Hill, Lawn Hill/Edgott Road. For indivisible abnormal loads, Hillesden Road, Gawcott Road from the A421 and Radcliffe Road	2017	Seven years	13 months	130-200	30-60

7.8.42 Information on the indicative construction programme is provided in Figure 7-9, which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-99. Consequently the peak traffic movements presented will not generally occur at the same time, although in some instances there may be some overlap.

7.8.43 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment

7.8.44 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;
- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network; and
- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

7.8.45 Within the study area, mass-haul movements have been assigned to A41 (across the study area and The Broadway/Edgecott Road (Grendon Underwood), Grendon Road/Buckingham Road (Edgcott) and Perry Hill (between Buckingham road and the boundary with CFA13).

7.8.46 Within the study area, construction traffic has been assigned to the roads listed in the construction lorry routes section below. Workforce traffic has been assigned to the same roads and additionally Blackgrove Road and Waddesdon Hill.

7.8.47 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.

- 7.8.48 From the neighbouring area to the north, the Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) area, the cumulative average construction traffic flows of approximately 470 cars/LGVs per day (two-way) and 20 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to A41 and Perry Hill.
- 7.8.49 From neighbouring area to the south, the Stoke Mandeville and Aylesbury (CFA11) area, the cumulative average construction traffic flows of approximately 310 cars/LGVs per day (two-way) and 20 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to the A41 Bicester Road.

Construction lorry routes

- 7.8.50 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Map TR-03-056 (Volume 5, Map Book 71):
- A41 Bicester Road overbridge satellite compound will be accessed via A41 Bicester Road;
 - Station Road overbridge satellite compound will be accessed via Station Road, A41 Bicester Road and Station Road, A4146, A418, A41 Bicester Road; and
 - Woodlands Cutting/Quainton auto-transformer feeder station satellite compound will be accessed via A41 Bicester Road, The Broadway (Grendon Underwood), Edgott Road, Grendon Road, Buckingham Road, Lawn Hill/Edgott Road and A421, Gawcott Road, Buckingham road, Hillesden Road, Perry Hill, Lawn Hill/Edgott Road. For indivisible abnormal loads, Hillesden Road, Gawcott Road from the A421 and Radcliffe Road.

Traffic management, road closures and diversions

- 7.8.51 The A41 Bicester Road, Blackgrove Road, Station Road and Edgcott Road/Lawn Hill are to be realigned; however construction of the new roads will be carried out 'off-line', meaning that the existing roads will remain open with no diversion of traffic required until the new off-line sections of road are complete. Traffic management and/or very short term closures i.e. overnight, off-peak or weekend, may be required to tie the new off-line sections of road into the existing roads immediately before switchover, although these are not considered to have a substantial impact upon motorised users.
- 7.8.52 The roads in the study area that will experience permanent closure are listed below and reported on in the operational scheme section of this report:
- Station Road, where it crosses the Proposed Scheme; and
 - Waddesdon Hill, at the junction with the A41 Bicester Road.

PRoW closures and diversions

- 7.8.53 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-100.
- 7.8.54 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.

Table 7-100: Waddesdon and Quainton temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
WAD/5/1	Waddesdon	068+650	Oct 2017	Temporary closure of PRoW Up to one year and 6 months	Construction of A41 Bicester Road Overbridge Temporary closure of PRoW
WAD/4/2 (public bridleway)	Waddesdon	069+500	Sep 2018	100m Up to nine months	Construction of Footpath WAD/4 Accommodation overbridge Temporary diversion to the west of the overbridge construction.
WAD/4A/1 (public footpath)	Waddesdon	069+500	Dec 2018	100m Up to nine months	Construction of WAD/3 accommodation underbridge Temporary diversion to the west of Footpath WAD/3 accommodation underbridge construction.
WAD/3/4 (public footpath)	Waddesdon	070+100	Jul 2019	400m Up to nine months	Construction of Waddesdon Embankment Local diversion as required to suit construction programme.
Public Bridleway and watercourse QUA/28A/2	Quainton	073+175	May 2018	Temporary closure of PRoW Up to nine months	Construction of Bridleway QUA/28A overbridge Temporary closure of PRoW
QUA/36/2 (public bridleway)	Quainton	075+350	Sep 2017	Temporary closure of PRoW Up to one year	Construction of Bridleway QUA/36 Accommodation Green Overbridge Temporary closure of PRoW
GUN/31/1	Quainton	075+950	Dec 2017	200m Up to six months	Construction of Bridleway GUN/28 Accommodation Green Overbridge Remains open during offline bridge construction, potentially with closure or slight diversion during construction of overlapping tie-in earthworks.
GUN/25/2	Quainton	075+950	Dec 2017	Temporary	Construction of Bridleway GUN/28

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
				closure of PRoW Up to six months	Accommodation Green Overbridge Temporary closure of PRoW
GUN/28/1	Quainton	075+950	Dec 2017	Temporary closure of PRoW Up to six months	Construction of Bridleway GUN/28 Accommodation Green Overbridge Temporary closure of PRoW

7.8.55 The following PRoW will be temporarily diverted by a negligible distance during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:

- WAD/5/2 (public footpath).

7.8.56 The following PRoW are likely to remain open during construction of the Proposed Scheme and are therefore not considered to be impacted:

- A41 Bicester Road;
- Blackgrove Road;
- Station Road;
- QUA/31/3 (public footpath);
- QUA/24A/1;
- QUA/26;
- Edgcott Road;
- QUA/35/1 (public footpath);
- CAG/2/1 (public footpath);
- GUN/25/1 (public bridleway); and
- CAG/3/1 (public bridleway).

7.8.57 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:

- A41 Bicester Road;
- Blackgrove Road;
- WAD/3/4 (public footpath);

- QUA/31/3 (public footpath);
- QUA/24A/1;
- QUA/26 (public footpath);
- Station Road;
- QUA/35/1 (public footpath);
- Edgcott Road;
- GUN/31/1; and
- CAG/2/1 (public footpath).

Utilities works

7.8.58 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area. More minor utilities works and associated traffic management measures are expected to result in only localised traffic and pedestrian impacts and be of short duration. Utilities works are not expected to result in substantial additional impacts.

7.8.59 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Roads within the study area which will be affected by utility works are:

- Quainton Road; and
- Station Road.

Avoidance and mitigation measures

1.1.1 The following measures have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce impacts on transport users:

- transporting construction materials and equipment along haul roads adjacent to the route of the Proposed Scheme where reasonably practicable to reduce lorry movements on the public highway;
- the majority of roads crossing the Proposed Scheme will be kept open during

construction resulting in reduced diversions of traffic onto alternative routes;

- provision of temporary alternative routes and/or building structures early to maintain connectivity for PRoW closed during construction to reduce loss of amenity;
- HGV routeing as far as reasonably practicable along the strategic road network, and using designated access roads, as shown in Volume 5: Map TR-03-056 (Volume 5, Traffic and transport Map Book); and
- providing on-site accommodation and welfare facilities in adjacent CFA to reduce daily travel by site workers.

1.1.2 The draft CoCP (see Volume 5: Appendix CT-003-000/1) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.8.60 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported through an over-arching framework travel plan⁶ that will require travel plans to be used, along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where reasonably practicable this will encourage the use of sustainable modes of transport or vehicle sharing.

7.8.61 The reductions in traffic generation arising from the travel plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.

7.8.62 The measures in the draft CoCP (Section 14.2) will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during construction of the Proposed Scheme on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.

1.1.3 Specific measures will include:

- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the morning peak hour and depart after the evening peak hour (although the

⁶ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective

assessment has assumed that some work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario) (draft CoCP Section 5); and

- excavated material will be reused where reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15.2).

Waddesdon and Quainton (CFA12) construction impacts

Key construction transport issues

- 7.8.63 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.
- construction vehicle movements to and from the construction site compounds;
 - temporary road closures and associated diversions of motorised users;
 - temporary PRoW closures and associated diversions of non-motorised users; and
 - short-term possessions of the Aylesbury Link.
- 7.8.64 No substantial traffic and transport impacts are expected on waterways and canals, public transport interchanges, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.8.65 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.
- 7.8.66 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-101 and Table 7-102 for AM peak and PM peak flows respectively.

Table 7-101: Waddesdon and Quainton strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
A41 Bicester Road, between Blackgrove Road and Aylesbury Vale Parkway station access (CFA11)	EB	913	1058	1153	174	94	48	9%	38%
	WB	633	734	836	146	102	48	14%	50%
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway (Grendon Underwood)	EB	912	1045	1143	148	98	72	9%	96%
	WB	722	827	910	142	83	72	10%	104%

Table 7-102: Waddesdon and Quainton strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
A41 Bicester Road, between Blackgrove Road and Aylesbury Vale Parkway station access (CFA11)	EB	697	812	909	110	97	46	12%	73%
	WB	832	969	1059	114	89	46	9%	68%
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway (Grendon Underwood) (Grendon Underwood)	EB	767	886	965	100	80	70	9%	235%
	WB	756	873	967	96	94	70	11%	277%

7.8.67 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-103 and Table 7-104 for AM peak and PM peak flows respectively.

Table 7-103: Waddesdon and Quainton local road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Blackgrove Road, between A41 Bicester Road overbridge satellite compound and A413	NB	156	179	207	2	28	0	16%	0%
	SB	252	289	313	3	24	0	8%	0%
Waddesdon Hill, between A41 Bicester Road overbridge satellite compound and Canon's Hill	NB	155	178	203	9	25	0	14%	0%
	SB	264	303	303	7	0	0	0%	0%
Station Road, between A41 Akeman Road and Quainton Road	NB	54	62	84	7	22	1	36%	24%
	SB	93	107	111	8	4	1	4%	20%
Fidlers Field Lane (also known as Snake Lane) between Lee Road/Lower Street and Station Road	NB	30	34	62	5	28	5	82%	1351%
	SB	74	85	94	5	9	5	10%	4052%
Edgcott Road/Lawn Hill, between Woodland Cutting/Quainton auto-transformer feeder station satellite compound and Perry Hill	EB	48	55	102	6	47	5	86%	506%
	WB	27	31	78	6	47	5	152%	405%
Lee Road/Lower Street, between Fidlers Field Lane (also known as Snake Lane) and Woodland Cutting/Quainton auto-transformer feeder station satellite compound	EB	99	113	122	24	9	5	8%	24%
	WB	97	111	158	13	47	5	42%	59%
Grendon Road/Buckingham Road, between Perry Hill and Main Street (Grendon Underwood)	NB	239	274	473	79	198	71	72%	899%
	SB	89	102	173	76	71	71	70%	1261%
The Broadway	NB	109	125	323	77	198	71	159%	1255%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
(Grendon Underwood), between Main Street (Grendon Underwood) and A41 Aylesbury Road	SB	220	253	324	79	71	71	28%	85%

Table 7-104: Waddesdon and Quainton local road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Blackgrove Road, between A41 Bicester Road overbridge satellite compound and A413	NB	302	350	373	1	23	0	7%	0%
	SB	112	129	156	1	26	0	20%	0%
Waddesdon Hill, between A41 Bicester Road overbridge satellite compound and Canon's Hill	NB	220	254	254	2	0	0	0%	0%
	SB	129	149	173	2	23	0	16%	0%
Station Road, between A41 Akeman Road and Quainton Road	NB	85	98	101	3	3	0	3%	20%
	SB	42	49	68	4	19	0	40%	13%
Fidlers Field Lane (also known as Snake Lane) between Lee Road/Lower Street and Station Road	NB	47	54	57	2	3	2	5%	670%
	SB	27	31	52	2	21	2	68%	1341%
Edgcott Road/Lawn Hill, between Woodland Cutting/Quainton auto-transformer feeder station satellite compound and Perry Hill	EB	32	37	77	2	40	2	106%	223%
	WB	31	36	75	4	40	2	110%	67%
Lee Road/Lower Street, between Fidlers Field Lane (also known as Snake Lane) and Woodland Cutting/Quainton auto-transformer feeder station satellite	EB	63	73	112	5	40	2	54%	42%
	WB	91	105	108	10	3	2	3%	19%

Location compound	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Grendon Road/Buckingham Road, between Perry Hill and Main Street (Grendon Underwood)	NB	83	96	166	70	70	70	73%	12117%
	SB	203	234	429	71	195	70	83%	4660%
The Broadway (Grendon Underwood), between Main Street (Grendon Underwood) and A41 Aylesbury Road	NB	203	234	303	70	70	70	30%	60583%
	SB	82	95	290	70	195	70	205%	15146%

- 7.8.68 There are no roads in the study area on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users.
- 7.8.69 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- A41 across the study area;
 - The Broadway /Edgcott Road (Grendon Underwood);
 - Grendon Road/Buckingham Road (Edgcott); and
 - Perry Hill, between Buckingham Road and the boundary with CFA13.
- 7.8.70 The HGVs used for the transportation of construction materials and equipment will use designated lorry routes as described in Section 7.8.50. Workforce traffic has been assigned to the same roads and additionally Blackgrove Road and Waddesdon Hill. Some of these roads may also have an increase in other Proposed Scheme traffic.
- 7.8.71 The implementation of the draft CoCP (see Volume 5: Annex CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

Junction performance

- 7.8.72 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.
- 7.8.73 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:
- A41 Aylesbury Road with The Broadway (Grendon Underwood);
 - A41 Akeman Road with Station Road;
 - A41 Bicester Road with Blackgrove Road and Waddesdon Hill;
 - Perry Hill with Buckingham Road and Lawn Hill;
 - Grendon Road with Edgcott Rd and Marsh Gibbon Road; and
 - Edgcott Road with Main Street and The Broadway (Grendon Underwood).
- 7.8.74 Of the junctions above, A41 with The Broadway (Grendon Underwood), A41 Akeman Road with Station Road, A41 Bicester Road with Blackgrove Road and Waddesdon Hill, and Perry Hill with Buckingham Road and Lawn Hill are priority junctions. The 2021 traffic flows with Proposed Scheme traffic (in PCU) at these junctions are shown in Table 7-105 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

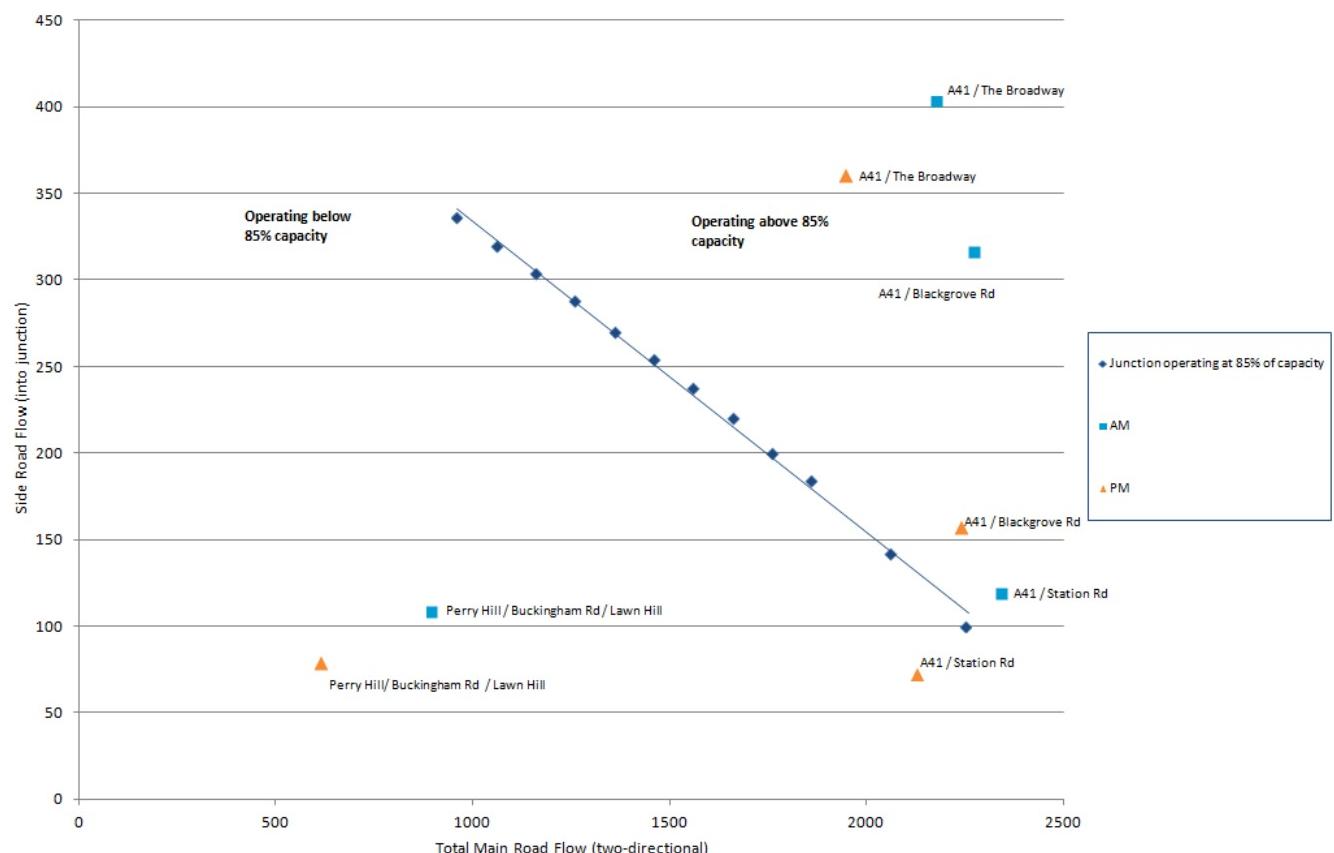
Table 7-105: Waddesdon and Quainton priority junction flows

Junction	2021 With HS2 construction traffic			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A41 Aylesbury Road with The Broadway (Grendon Underwood)	2179	403	1948	360
A41 Akeman Road with Station Road	2343	119	2128	72
A41 Bicester Road with Blackgrove Road and Waddesdon Hill	2273	316	2239	157
Perry Hill with Buckingham Road and Lawn Hill	896	108	616	79

- 7.8.75 The priority junctions have been plotted on a graph, shown in Figure 7-10, that shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

- 7.8.76 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-10: Waddesdon and Quainton priority junction assessment 2021



- 7.8.77 The graph illustrates that the junction of Perry Hill with Buckingham Road and Lawn Hill falls below the 'threshold' of capacity during both AM and PM peaks and is therefore not forecast to be close to its theoretical capacity of 85% during construction of the Proposed Scheme. As a result, it is not considered to warrant individual assessment and has therefore not been assessed with junction assessment software
- 7.8.78 The assessment illustrates that nearly all other affected priority junctions in the study area fall above the 'threshold' of capacity during both AM and PM peaks (apart from PM peak for the junction of A41 Akeman with Station Road) during construction of the Proposed Scheme. This may be mitigated through the measures detailed in the draft CoCP, as outlined previously.

- 7.8.79 A qualitative assessment has been carried out for the Grendon Road with Edgcott Rd and Marsh Gibbon Road, and Edgcott Road with Main Street and The Broadway (Grendon Underwood) junctions meeting the assessment criteria, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows (including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.
- 7.8.80 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the Grendon Road with Edgcott Rd and Marsh Gibbon Road, and Edgcott Road with Main Street and The Broadway (Grendon Underwood) junctions.

Accidents and safety

- 7.8.81 The proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Rail

- 7.8.82 The Aylesbury Link is a single track freight only line and is a continuation of the passenger service Marylebone to Aylesbury Line which terminates at Aylesbury Vale Parkway station. Freight services operate on the line at a frequency of approximately two trains per day.
- 7.8.83 East West Rail Link passenger services between Milton Keynes and Aylesbury are expected to commence operating on the upgraded Aylesbury Link alongside the Proposed Scheme from December 2017 with a service frequency of one train per hour in each direction.
- 7.8.84 The construction of the Proposed Scheme in this study area will require temporary possessions on the Aylesbury Link for various road, rail and bridleway overbridge works and bridge demolition. Table 7-106 summarises the possessions which are forecast to be required.

Table 7-106: Waddesdon and Quainton summary of rail possessions required

Element name	Location (chainage)	Description of works	Number of possessions	Type	Duration	Year/Duration
Various road, rail and bridleway overbridge works and bridge demolition at 74+175	69+920 & 071+900 & 072+000 & 072+975 & 74+175 & 074+200 & 075+350 & 75+900 & 075+850	Civil engineering works relating to road, rail and bridleway overbridge works and bridge demolition.	9	All line block	54 hr possession	2018-2019
			14	All line block	27 hr possession	

Pedestrians, cyclists and equestrians

- 7.8.85 The review of PRoW links indicates there will be additional walking distances on four routes due to temporary diversions. None of these links will require a diversion of more than 500m. Five PRoW will be temporarily stopped up during construction of the Proposed Scheme.
- 7.8.86 Table 7-107 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.8.87 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-047b to CT-05-051-R4 (Volume 2, Map Book 12).

Table 7-107: Waddesdon and Quainton summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
WAD/5/1	Waddesdon	068+650	Construction of A41 Bicester Road Overbridge	Temporary closure of PRoW	1	Temporary closure of PRoW	Temporary closure of PRoW
WAD/4/2 (public bridleway)	Waddesdon	069+500	Construction of Footpath WAD/4 Accommodation overbridge	Temporary diversion to the west of the overbridge construction.	0	100m	1 min
WAD/4A/1 (public footpath)	Waddesdon	069+500	Construction of WAD/3 accommodation underbridge	Temporary diversion to the west of Footpath WAD/3 accommodation underbridge construction.	8	100m	1 min
WAD/3/4 (public footpath)	Waddesdon	070+100	Construction of Waddesdon Embankment	Local diversion as required to suit construction programme.	1	400m	5 min
Public Bridleway and watercourse QUA/28A/2	Quainton	073+175	Construction of Bridleway QUA/28A overbridge	Temporary closure of PRoW	10	Temporary closure of PRoW	Temporary closure of PRoW
QUA/36/2 (public bridleway)	Quainton	075+350	Construction of Bridleway QUA/36 Accommodation Green Overbridge	Temporary closure of PRoW	0	Temporary closure of PRoW	Temporary closure of PRoW

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
GUN/31/1	Quainton	075+950	Construction of Bridleway GUN/28 Accommodation Green Overbridge	Remains open during offline bridge construction, potentially with closure or slight diversion during construction of overlapping tie-in earthworks.	7	200m	2 min
GUN/25/2	Quainton	075+950	Construction of Bridleway GUN/28 Accommodation Green Overbridge	Temporary closure of PRoW	TBC	Temporary closure of PRoW	Temporary closure of PRoW
GUN/28/1	Quainton	075+950	Construction of Bridleway GUN/28 Accommodation Green Overbridge	Temporary closure of PRoW	7	Temporary closure of PRoW	Temporary closure of PRoW

Parking and loading

- 7.8.88 The construction of the Proposed Scheme will require land currently used as an overflow car park for the Buckinghamshire Railway Centre near Quainton, which is regularly used at weekends, especially during the summer months. This will potentially result in the loss of approximately 600 overflow parking spaces (assumed 25 sqm per space).

Waddesdon and Quainton (CFA12) Proposed Scheme operation description

Operation trip assumptions

- 7.8.89 The Proposed Scheme IMD will be located at Calvert, within the Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) area to the north of the study area.
- 7.8.90 During operation of the Proposed Scheme, the IMD will result in a change in traffic flows on the A41, Buckingham Road/Grendon Road/Edgecott Road and The Broadway (Grendon Underwood) within the study area.
- 7.8.91 The impact of the IMD upon the road network for 2026 and 2041 has been assessed and is detailed in the following section.
- 7.8.92 It is forecast that there will be no further substantial changes in demand on existing transport infrastructure within the study area for 2026 and 2041.

Traffic management, road closures and diversions

- 7.8.93 Table 7-108 identifies the roads in the study area that will experience permanent closure.

Table 7-108: Waddesdon and Quainton permanent road closures and diversions

Name	Location	Diversion route	Approximate length of diversions
Station Road, where it crosses the Proposed Scheme	Quainton	Diversion via new Station Road overbridge	2.5km
Waddesdon Hill, at the junction with the A41 Bicester Road	Waddesdon	Diversion via realigned A41	2.5km

- 7.8.94 The permanent diversions will affect approximately 15,980 vehicles a day (12 hour 2021 base flow) on Station Road and 3,720 vehicles a day on Waddesdon Hill.
- 7.8.95 Station Road will remain open during operation of the Proposed Scheme for local access to existing properties and Buckinghamshire Railway Centre only. However, there will therefore be a substantial reduction in traffic on this link, which may have a beneficial impact upon non-motorised users with regard to crossing the highway.
- 7.8.96 The permanent closures will not result in traffic flow changes on any other existing link within the study area, although motorised users will be subject to an increase in travel distance as a result of the permanent diversions of up to 2.5km, as a worst case scenario.

Avoidance and mitigation measures

- 7.8.97 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads that will be crossed by the Proposed Scheme in their current location, or very close to their current location resulting in no substantial diversions of traffic onto alternative routes;
 - retaining PRoW that will be crossed by the Proposed Scheme, with localised realignments kept to a minimum length where practicable;

- 7.8.98 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Waddesdon and Quainton (CFA12) operation impacts

- 7.8.99 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.

- 7.8.100 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.
- 7.8.101 The IMD at Calvert will generate traffic on the highway network within the study area during operation of the Proposed Scheme and has been accounted for in the assessment years of 2026 and 2041.

Key operation transport issues

- 7.8.102 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.
- permanent road closures or realignments and associated diversions to motorised users;
 - permanent change in traffic flows due to the Proposed Scheme IMD;
 - permanent relocation of bus stops; and
 - permanent realignment or closure of PRoW and associated diversions to non-motorised users.

- 7.8.103 No substantial traffic and transport impacts are expected on waterways and canals, rail services, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.8.104 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.
- 7.8.105 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.
- 7.8.106 Within the study area, the impact of IMD has been accounted for during the 2026 and 2041 operational years of assessment accordingly.
- 7.8.107 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows for all roads within the study area, apart from those affected by traffic generated by the IMD as discussed below, are expected to remain the same as the 2026 and 2041 future baseline traffic flows.
- 7.8.108 Traffic flow changes assigned to the road network within the study area, where considered to be impacted by IMD traffic, are presented in Table 7-109,
- 7.8.109 Table 7-110 and Table 7-111 for AM peak, PM peak and off-peak (21:00-22:00) hour flows for 2026 year of operation, respectively.

- 7.8.110 Assessment of the off-peak has been included as it is the time period where the highest number of IMD vehicles are have been forecast to arrive at and depart the IMD. It therefore represents a 'worst case' and most robust scenario upon the road network.

Table 7-109: Waddesdon and Quainton strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – AM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway, Grendon Underwood)	EB	1138	1138	82	0	0	0%	0%
	WB	901	905	76	+4	0	0%	0%
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	1083	1089	78	+6	0	1%	0%
	WB	858	858	72	0	0	0%	0%
Buckingham Road/Grendon Road/Edgecott Road, between Perry Hill and The Broadway (Grendon Underwood)	NB	296	308	8	+12	0	4%	0%
	SB	110	110	6	0	0	0%	0%
The Broadway (Grendon Underwood) (Grendon Underwood), between Edgecott Road and A41 Aylesbury Road	NB	134	146	6	+12	0	9%	0%
	SB	272	272	9	0	0	0%	0%

Table 7-110: Waddesdon and Quainton strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – PM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway (Grendon Underwood)	EB	969	973	33	+4	0	0%	0%
	WB	955	955	28	0	0	0%	0%
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	919	919	31	0	0	0%	0%
	WB	906	912	26	+6	0	1%	0%
Buckingham Road/Grendon Road/Edgecott Road, between Perry Hill and The Broadway (Grendon Underwood)	NB	104	104	1	0	0	0%	0%
	SB	254	266	2	+12	0	5%	0%
The Broadway (Grendon Underwood) (Grendon Underwood), between Edgecott Road and A41 Aylesbury Road(Grendon Underwood)	NB	253	253	0	0	0	0%	0%
	SB	103	115	0	+12	0	12%	0%

Table 7-111: Waddesdon and Quainton strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – Off-peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway (Grendon Underwood)	EB	178	188	0	+10	0	6%	0%
	WB	223	225	0	+2	0	1%	0%

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Underwood)								
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	178	192	0	+14	0	8%	0%
	WB	223	226	0	+3	0	1%	0%
Buckingham Road/Grendon Road/Edgecott Road, between Perry Hill and The Broadway (Grendon Underwood)	NB	29	52	0	+23	0	79%	0%
	SB	56	62	0	+6	0	11%	0%
The Broadway (Grendon Underwood) (Grendon Underwood), between Edgecott Road and A41 Aylesbury Road(Grendon Underwood)	NB	50	73	0	+23	0	46%	0%
	SB	27	33	0	+6	0	22%	0%

- 7.8.111 During the AM and PM peak, there is only up to a 1% increase in traffic flow (up to six additional vehicles) on the A41 as a result of IMD traffic, which will be insufficient to give rise to substantial impacts upon motorised and non-motorised users. During the off-peak hour, there is up to 8% increase in traffic (up to 14 additional vehicles) as a result of IMD traffic. However baseline flows are much lower than in the AM and PM peaks and well under the theoretical capacity of the link. Therefore the increase in traffic in the off-peak will also be insufficient to give rise to substantial impacts upon motorised or non-motorised users.
- 7.8.112 During the AM and PM peak, there up to 12% increase in traffic flow on Buckingham Road/Grendon Road/Edgecott Road and The Broadway (Grendon Underwood), Grendon Underwood. However, this only represents an increase of 12 vehicles during peak hour and baseline flows are well under the theoretical capacity of the links. The increase in traffic will be insufficient to give rise to substantial impacts upon motorised or non-motorised users. During the off-peak hour, there is up to 79% increase in traffic (up to 56 additional vehicles) as a result of IMD traffic. However, the baseline flows are low, at up to 72 vehicles an hour, and well under the theoretical capacity of the link. Therefore the increase in traffic in the off-peak will also be insufficient to be give rise to substantial impacts upon motorised or non-motorised users.

Strategic and local road network traffic flows 2041

- 7.8.113 Traffic flow changes assigned to the local road network within the study area, where considered to be impacted by IMD traffic, are presented in Table 7-112, Table 7-113 and Table 7-114 for AM peak, PM peak and off-peak (21:00-22:00) hour flows for 2041 year of operation, respectively.

Table 7-112: Waddesdon and Quainton strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – AM peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway (Grendon Underwood)	EB	1405	1405	102	0	0	0%	0%
	WB	1112	1116	94	+4	0	0%	0%
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	1261	1267	91	+6	0	0%	0%
	WB	998	998	84	0	0	0%	0%
Buckingham Road/Grendon Road/Edgecott Road, between Perry Hill and The Broadway (Grendon Underwood)	NB	356	368	10	+12	0	3%	0%
	SB	132	132	7	0	0	0%	0%
The Broadway (Grendon Underwood), between Edgecott Road and A41 Aylesbury Road(Grendon Underwood)	NB	162	174	1	+12	0	7%	0%
	SB	328	328	2	0	0	0%	0%

Table 7-113: Waddesdon and Quainton strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – PM peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway (Grendon Underwood)	EB	1215	1219	41	+4	0	0%	0%
	WB	1197	1197	35	0	0	0%	0%
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	1084	1084	37	0	0	0%	0%
	WB	1068	1074	31	+6	0	1%	0%
Buckingham Road/Grendon Road/Edgecott Road, between Perry Hill and The Broadway (Grendon Underwood)	NB	127	174	7	0	0	0%	0%
	SB	310	328	11	+12	0	4%	0%
The Broadway (Grendon Underwood), between Edgecott Road and A41 Aylesbury Road(Grendon Underwood)	NB	309	309	0	0	0	0%	0%
	SB	126	138	1	+12	0	10%	0%

Table 7-114: Waddesdon and Quainton strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – Off-peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Akeman Road/High Street, between Blackgrove Road and The Broadway (Grendon Underwood)	EB	224	234	0	+10	0	4%	0%
	WB	280	282	0	+2	0	1%	0%
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	224	238	0	+14	0	6%	0%
	WB	280	283	0	+3	0	1%	0%
Buckingham Road/Grendon Road/Edgecott Road, between Perry Hill and The Broadway (Grendon Underwood)	NB	37	60	0	+23	0	62%	0%
	SB	71	77	0	+6	0	9%	0%
The Broadway (Grendon Underwood), between Edgecott Road and A41 Aylesbury Road(Grendon Underwood)	NB	63	86	0	+23	0	37%	0%
	SB	34	40	0	+6	0	17%	0%

7.8.114 The increase in traffic flow on the A41, Buckingham Road/Grendon Road/Edgecott Road and The Broadway (Grendon Underwood) as a result of the IMD is the same during the 2041 year of assessment as reported for the 2026 year of assessment. However, as baseline traffic flows for 2041 are higher than those for 2026, the impact of the IMD traffic is expected to be slightly less during 2041 than 2026. As with the 2026 year of assessment, the number of trips generated by workers commuting to and from the IMD is likely to be insufficient to give rise to substantial impacts upon motorised or non-motorised users.

Junction capacity 2041

7.8.115 During operation of the Proposed Scheme, junctions have been subject to assessment whereby peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak or off-peak (21:00-22:00) hour two-way traffic flow of 2% or more due to the Proposed Scheme, on any arm of the junction. For operation of the Proposed Scheme, the assessment has been carried out for assessment year 2041, as it represents the worst case scenario whereby the baseline flows are higher than in assessment year 2026, and is therefore more robust.

7.8.116 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:

- A41 Aylesbury Road with The Broadway (Grendon Underwood);
- A41 Akeman Road with Station Road;
- A41 Bicester Road with Blackgrove Road and Waddesdon Hill;
- Perry Hill with Buckingham Road and Lawn Hill;
- Grendon Road with Edgcott Rd and Marsh Gibbon Road; and
- Edgcott Road with Main Street and The Broadway (Grendon Underwood).

7.8.117 The 2041 traffic flows with Proposed Scheme traffic (in PCU) at these priority junctions are shown in Table 7-115 for the AM and PM peak, and the off-peak. Traffic flows presented are two-way on the main road and one way on the side road, approaching the junction.

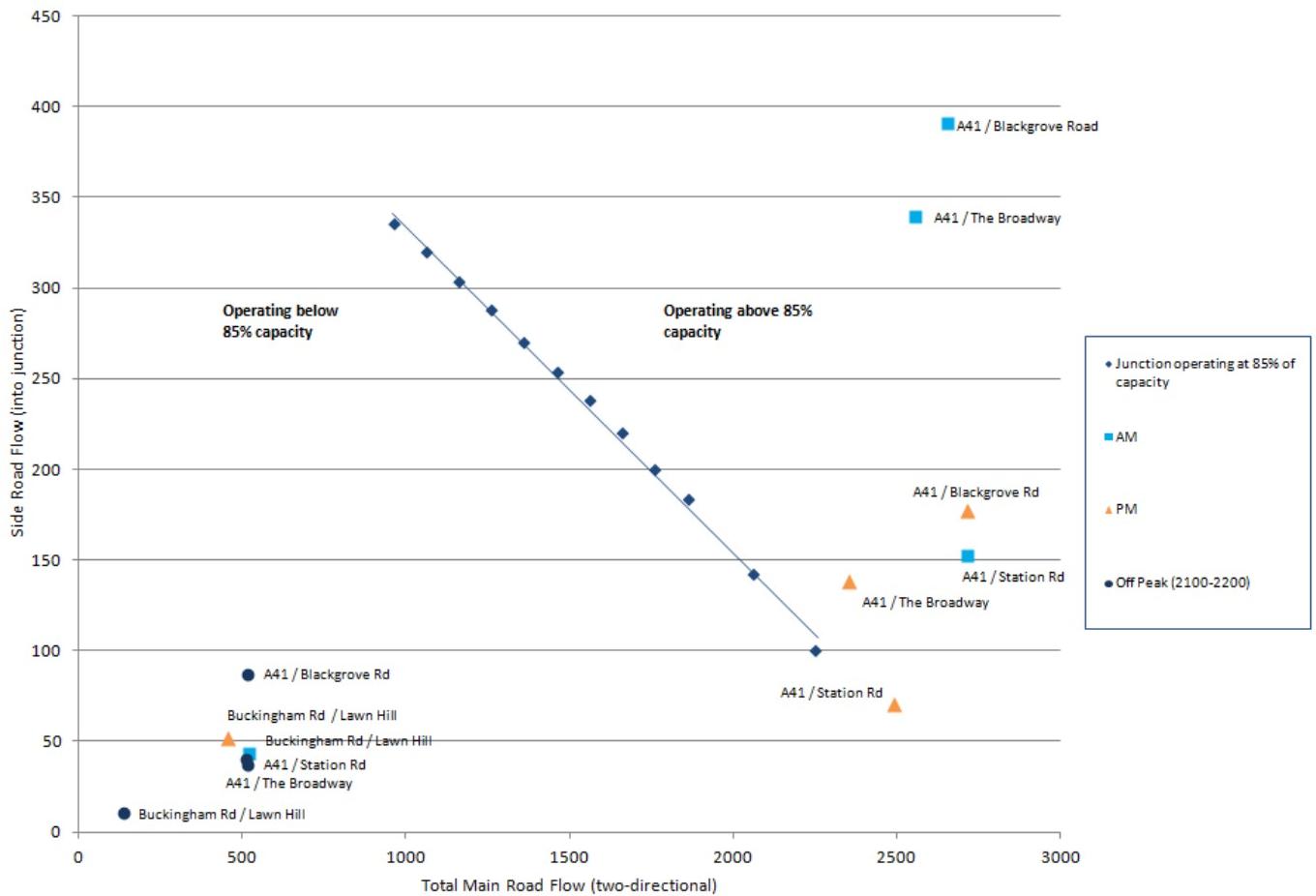
Table 7-115: Waddesdon and Quainton IMD priority junction flows 2041

Junction	2041 Operation					
	AM peak		PM peak		Off-peak (21:00-22:00)	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A41 Aylesbury Road with The Broadway (Grendon Underwood)	2558	339	2353	139	513	40
A41 Akeman Road with Station Road	2716	152	2492	71	517	37
A41 Bicester Road with Blackgrove Road and Waddesdon Hill	2657	391	2714	178	517	87
Perry Hill with Buckingham Road and Lawn Hill	518	43	452	52	136	10

7.8.118 The priority junctions have been plotted on a graph, shown in Figure 7-11, that shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

7.8.119 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-11: Waddesdon and Quainton IMD junction assessment 2041



- 7.8.120 The graph illustrates that the junction of Perry Hill with Buckingham Road and Lawn Hill falls below the 'threshold' of capacity and is therefore not predicted to be close to its theoretical capacity of 85% during operation of the Proposed Scheme. As a result, it is not considered to warrant individual assessment and has therefore not been assessed with junction assessment software.

- 7.8.121 The assessment shows that the junctions of A41 Aylesbury Road with The Broadway (Grendon Underwood), A41 Bicester Road with Blackgrove Road and Waddesdon Hill, and A41 Akeman Road with Station Road fall below the 'threshold' of capacity during the off-peak, which is the busiest activity period for vehicles arriving and departing the IMD. However, during the AM and PM peaks, the graph indicates that these junctions may be subject to additional intermittent traffic congestion and delay during operation of the Proposed Scheme. This may be mitigated in part through the measures noted previously in this section. The IMD results in an increase in traffic of up to 10%, but only up to 12 additional vehicles per hour, on The Broadway (Grendon Underwood) and only up to 1% (up to six additional vehicles per hour) on the A41 during these periods. Consequently it is likely that the additional traffic at these junctions would be insufficient to have a substantial impact on their operation..
- 7.8.122 A qualitative assessment has been carried out for the Grendon Road with Edgcott Rd and Marsh Gibbon Road and Edgcott Road with Main Street and The Broadway (Grendon Underwood) junctions meeting the assessment criteria, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak and off-peak (21:00-22:00) hour two-way traffic flows (including Proposed Scheme traffic during operation) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during operation of the Proposed Scheme.
- 7.8.123 The assessment indicates that increased traffic during the most intensive periods of construction is unlikely to cause additional intermittent traffic congestion and delay at the junctions of Grendon Road with Edgcott Road and Marsh Gibbon Road, and Edgcott Road with Main Street and The Broadway (Grendon Underwood) during peak periods.

Accidents and safety

- 7.8.124 The Proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during operation.

Public transport interchange

- 7.8.125 Table 7-116 identifies the public transport interchanges in the study area that will change in function due to during operation of the Proposed Scheme. The approximate additional journey time from start to end of route as a result of diversions has been recorded based upon average speed of service and length of diversion.

Table 7-116: Waddesdon and Quainton permanent changes to public transport interchanges

Public transport interchange	Services	Impact	Approximate distance of relocation	Approximate impact of relocation on journey time (nearest minute)
Bus stops on A41 Bicester Road	2 buses an hour during peak	Permanent relocation of bus stops due to realignment of A41 Bicester Road	500m	6min

Pedestrians, cyclists and equestrians

- 7.8.126 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction..
- 7.8.127 The review of PRoW links indicates that there will be additional walking distances on 11 routes due to permanent realignments, with one of these links requiring a diversion of more than 500m.
- 7.8.128 Table 7-117 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.8.129 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-047b to CT-06-051-R4 (Volume 2, Map Book 12).

Table 7-117: Waddesdon and Quainton summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
A41 Bicester Road	Waddesdon	067+600	Permanent diversion to FMA/2 (public footpath), Bridleway FMA/1 accommodation bridge and WAD/6/1.	0	800m	10min
Blackgrove Road	Waddesdon	068+550	Permanent diversion across realigned A41 Bicester Road overbridge	14	200m	2min
WAD/3/4 (public footpath)	Waddesdon	070+100	Permanent diversion across Footpath WAD/3 accommodation overbridge at ch 69+9510.	1	450m	5min
QUA/31/3 (public	Quainton	072+300	Permanent diversion via new	3	500m	6min

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
footpath)			station road overbridge.			
QUA/24A/1	Quainton	073+175	Permanent diversion to Quainton Bridleway overbridge at ch 72+900. Increased PRoW length.	10	215m	2.6min
QUA/26 (public footpath)	Quainton	073+850	Subject to Network Rail approval on the underbridge, footpath is permanently diverted to the underbridge.	2	200m	2 min
Station Road	Quainton	071+900	Permanent diversion to the realigned Station Road.	21	700m	8 min
QUA/35/1 (public footpath)	Quainton	075+300	Permanently divert footpath around Bridleway QUA/36 accommodation overbridge embankment.	0	100m	1min
Edgcott Road	Quainton	074+200	Permanent diversion to the realigned Edgcott Road.	7	100m	1min
GUN/31/1	Quainton	075+950	Permanent diversion to Bridleway GUN/28 accommodation overbridge at ch 75+850.	7	200m	2min
CAG/2/1 (public footpath)	Quainton	076+550	Permanently diversion beneath Footpath CAG/2 underbridge once constructed.	3	50m	1min

- 7.8.130 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

Parking and loading

- 7.8.131 The operation of the Proposed Scheme will require land currently used as an overflow car park for the Buckinghamshire Railway Centre near Quainton, which is regularly used at weekends, especially during the summer months. This will potentially result in the loss of approximately 400 overflow parking spaces (assumed 25 sqm per space).

7.9 Calvert, Steeple Claydon, Twyford and Chetwode (CFA13)

Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) Proposed Scheme description

- 7.9.2 The Proposed Scheme through this area will be approximately 10km in length. It will commence at the northern edge of Sheephause Wood, to the south of Calvert, and then proceed in a north-west direction parallel to the realigned Aylesbury Link. It will then pass to the east of Calvert, under the realigned Bicester to Bletchley Line, then west of Steeple Claydon, broadly following the alignment of the disused Great Central Main Line (GCML).
- 7.9.3 The route will continue to the north-west and will pass to the east of Twyford, crossing the Padbury Brook three times before passing to the east of Godington. It will continue past the west of Chetwode and on towards the county boundary between Buckinghamshire and Oxfordshire, to the west of Barton Hartshorn.
- 7.9.4 The study area is predominantly rural land, with agriculture being the main land use. Development is typically small villages and isolated farmsteads. The largest settlement is Steeple Claydon, to the east of the Proposed Scheme and north of the IMD.
- 7.9.5 The Calvert, Steeple Claydon, Twyford and Chetwode study area includes the A4421 Neunkirchen Way/Wretchwick Way/Charbridge Lane, A421 Tingewick Road, A41 Aylesbury Road and local roads that are affected by the Proposed Scheme. The Proposed Scheme crosses eight roads within the study area.
- 7.9.6 There are two railway lines within the area. The Bicester to Bletchley Line forms part of the former Oxford to Cambridge Line, however is disused past Queen Catherine Road, east of Steeple Claydon. The Aylesbury Link follows the line of the former GCML and is operational as far as the intersection with the Bicester to Bletchley line at Claydon Junction, but disused north of Calvert. The Aylesbury Link and Bicester to Bletchley Line are connected by a short curved section of track to the north-east of Calvert. The operational sections of both lines are currently consigned to freight movements only.
- 7.9.7 PRoW within the area include the North Buckinghamshire Way and the Bernwood Jubilee which the Proposed Scheme crosses to the north of Waddesdon and the south of Chetwode respectively. Cycleways include National Cycle Route 51 which the Proposed Scheme crosses to east of Twyford. The Proposed Scheme crosses PRoW in 18 locations. In addition to the 18 PRoW, the Proposed Scheme crosses eight roads with the potential use by non-motorised users.

- 7.9.8 The Proposed Calvert IMD will be located in the land adjacent to the Proposed Scheme, north-east of the Bicester to Bletchley Line crossing, and the associated tracks will run west to east alongside the Bicester to Bletchley Line for approximately 3km, approximately 600m south of Steeple Claydon. It will be operational and accessible by rail at all times and capable of 24 hours operation seven days per week. The majority of materials and equipment required for maintenance of the Proposed Scheme during operation will be delivered to the IMD by rail. Consequently deliveries by road will be nominal in number. The IMD serves three phases:
- construction: the IMD will provide supporting logistic during construction phase. This may require much more space than needed for regular operation. The site of the IMD shall be made available from an early stage so that, it can be considered for use as a construction site/depot for the Proposed Scheme with temporary rail sidings during the construction stage. To this end the Calvert depot area is large enough to be considered, if required, as a logistics centre for the storage of materials during the construction phase of the Proposed Scheme line;
 - testing and commissioning: measurement vehicles, correction of construction failures, test runs of maintenance vehicles and high speed trains; and
 - regular operation: in the first years no substantial material transport is required, and activity would mainly focus on inspection and monitoring, beside a few corrective action (e.g. warranty issues). The material transports and corresponding logistics and storage activities would increase following the need for replacement of components (e.g. rails, overhead lines, sleepers etc.) and this is considered as the worst case 'peak activity' assessment.
- 7.9.9 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.9.10 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2 (CFA Report 21).
- 7.9.11 The Proposed Scheme will leave the Waddesdon and Quainton area (CFA12) on an embankment. It will run parallel to, and to the west side of, the existing Aylesbury Link which runs along the former GCML corridor, with Sheephause Wood located to the east and Calvert Landfill to the west. To accommodate the Proposed Scheme, the Aylesbury Link will be realigned eastwards between Sheephause wood and the Bicester to Bletchley Line. After the route passes under the Bicester to Bletchley Line, it will ascend and diverge from the former GCML in cutting.
- 7.9.12 Through this section, the Proposed Scheme will run in the Calvert cutting, which is approximately 4km long. The cutting runs along the western side of the realigned Aylesbury Link, before continuing north-west parallel to the former GCML rail corridor.

- 7.9.13 The Calvert IMD will occupy land north-east of the intersection of the Proposed Scheme and the Bicester to Bletchley Line. The Bicester to Bletchley Line will be realigned up to 30m to the north and will run alongside the IMD, crossing over the top of the Proposed Scheme at the western end. The IMD tracks will run east-west parallel to the Bicester to Bletchley Line, extending from the East-West Rail overbridge to west of the Queen Catherine Road level crossing. Rail access spurs will connect the Proposed Scheme to the IMD from the south and to the north. Key features of the Proposed Scheme in this section will include Charndon Lodge underbridge to reinstate Perry Hill underneath the realigned Bicester to Bletchley Line and a new Addison Road overbridge, realigning the road to the east of its existing position.
- 7.9.14 The Proposed Scheme will diverge east from the alignment of the former GCML, which is disused north of the crossing of the Bicester to Bletchley Line. The Proposed Scheme will continue north-west, rising out of a cutting north of West Street and onto an embankment, passing east of Twyford and crossing the Padbury Brook on a viaduct. The route will then descend into a cutting for approximately 1km to the end of this section.
- 7.9.15 In addition to the Proposed Scheme main tracks, the southern half of this section will include a third track to the east. This third track is the northern access spur proving access into and out of the IMD and will run alongside the Proposed Scheme main tracks for 1.3km before diverging to the east into the IMD. Key features of this section will include an overbridge at West Street to reinstate West Street and a viaduct at Twyford to carry the Proposed Scheme over the Padbury Brook
- 7.9.16 To the north of Godington, the Proposed Scheme will pass along a series of embankments and two viaducts as the route crosses a meander of the Padbury Brook. Key features of this section will include Godington east and west viaducts spanning a meander of the Padbury Brook and floodplain.
- 7.9.17 Gently curving to the north-west, the Proposed Scheme will pass to the west of Chetwode in a cutting. The route will exit the cutting to re-join the route of the former GCML on embankment at the county boundary of Buckinghamshire and Oxfordshire, to the west of Barton Hartshorn.

Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) assessment methodology

- 7.9.18 Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) assessment methodology used is described in Section 5 and Section 7.2 of this Transport Assessment report. Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The factors have been derived for the individual road types and relevant wards. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday.

- 7.9.19 The TEMPRO growth factors used in the study area are shown in Table 7-118: Calvert, Steeple Claydon, Twyford and Chetwode summary of percentage growth applied to traffic.
- 7.9.20 Within the study area baseline traffic volumes have been amended to take specific account of the consented changes to the EfW facility at Greatmoor.
- 7.9.21 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading. As a consequence, local transport impacts may be over-estimated.
- 7.9.22 The link capacities of roads within the study area have been analysed to understand if they would experience congestion in the future baseline, without the Proposed Scheme. Within the study area, link capacities have been assessed for roads affected by the Proposed Scheme during construction (2021 baseline) and operation (2026 and 2041 baselines).
- 7.9.23 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021, 2026 and 2041 baselines have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the this threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) future baseline

Key future baseline issues

- 7.9.24 Future baseline traffic flows have accounted for an increase in traffic on roads in the study area by up to 16% (2021) during construction of the Proposed Scheme and by up to 22% (2026) and 44% (2041) during operation of the Proposed Scheme, unless where specific committed developments, where applicable, have been taken into account.
- 7.9.25 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 11%-16%;
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 18%-26%; and

- Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 34%-54%.

7.9.26 As a result of this analysis, no roads subject to assessment within the study area will potentially experience intermittent traffic congestion and delay in the 2021 or 2026 future baseline situation, without Proposed Scheme traffic.

7.9.27 The roads subject to assessment within the study area which will potentially experience peak period intermittent traffic congestion and delay in the 2041 future baseline situation, without Proposed Scheme traffic, are listed below.

- A41 (between Bicester and Grendon Underwood).

7.9.28 The proposed future East West Rail Link will provide a strategic railway connection between East Anglia and Central, Southern and Western England. It is expected to be fully operational by 2019. East West Rail Link passenger services between Milton Keynes and Aylesbury are expected to commence operating on the upgraded Aylesbury Link alongside the Proposed Scheme from December 2017 with a service frequency of one train per hour in each direction. Once operational, these rail links are likely to change the existing pattern of public transport use and modal share within the study area.

7.9.29 There are no other key future baseline issues identified within the study area.

Land use assumptions

7.9.30 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional. The development specific to the study area which has been taken into account during assessment is detailed below.

Greatmoor Energy from Waste facility

7.9.31 Within the study area, baseline traffic volumes have been amended to take specific account of the consented changes to the EfW facility at Greatmoor. These include the provision of direct road access to the facility from the A41 via a disused railway, which will substantially reduce the number of HGVs on country lanes in the vicinity of Calvert.

Table 7-118: Calvert, Steeple Claydon, Twyford and Chetwode summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	11%	18%	34%
Maximum	16%	26%	54%
Average	14%	22%	44%

Transport growth assumptions

- 7.9.32 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.
- 7.9.33 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.

Strategic and local road network traffic flows

- 7.9.34 Roads within the study area include those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area the strategic roads affected by the Proposed Scheme in the study area are the A4421 Neunkirchen Way/Wretchwick Way/Charbridge Lane, A421 Tingewick Road and the A41 Aylesbury Road. The local highway links that will be affected by the Proposed Scheme include School Hill, Perry Hill, Addison Road, Main Street, West Street, School End/Barton Hartshorn Road, Barton Road, Buckingham Road, Gawcott Road, and Manor Farm Road..
- 7.9.35 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B(iii).
- 7.9.36 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.9.37 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area , are presented in Table 7-119 and Table 7-120 for AM peak and PM peak flows respectively.

- 7.9.38 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-121 and Table 7-122 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.9.39 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-119: Calvert, Steeple Claydon, Twyford and Chetwode strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A41 (between Bicester and Grendon Underwood)	EB	912	66	1011	73	1083	78	1261	91	99	171	349	11%	19%	38%
	WB	722	61	801	68	858	72	998	84	79	136	276	11%	19%	38%

Table 7-120: Calvert, Steeple Claydon, Twyford and Chetwode strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A41 (between Bicester and Grendon Underwood)	EB	767	26	854	29	919	31	1084	37	87	152	317	11%	20%	41%
	WB	756	22	842	24	906	26	1068	31	86	150	312	11%	20%	41%

Table 7-121: Calvert, Steeple Claydon, Twyford and Chetwode local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
School Hill (east of Brackley Lane, Calvert)	EB	134	2	154	2	167	2	206	3	20	33	72	15%	25%	54%
	WB	114	8	130	9	142	10	175	12	16	28	61	15%	25%	54%
School Hill (west of Brackley Lane, Calvert)	EB	125	6	144	1	156	2	193	4	19	31	68	15%	25%	54%
	WB	107	6	123	1	134	1	165	3	16	27	58	15%	25%	54%
Perry Hill (south of School Hill, Calvert)	NB	110	10	126	5	137	6	169	9	16	27	59	15%	25%	54%
	SB	167	8	192	3	209	4	257	6	25	42	90	15%	25%	54%
School Hill (west of Perry Hill, Calvert)	EB	56	4	64	5	70	5	86	6	8	14	30	15%	25%	54%
	WB	70	5	80	6	87	6	108	8	10	17	38	15%	25%	54%
School Hill east of Addison Road, Calvert)	EB	84	5	96	6	105	6	129	8	12	21	45	15%	25%	54%
	WB	58	2	67	2	72	2	89	3	9	14	31	15%	25%	54%
Addison Road (south of Bicester to Bletchley rail line, Steeple Claydon)	NB	68	1	78	1	85	1	105	2	10	17	37	15%	25%	54%
	SB	77	0	89	0	97	0	119	0	12	20	42	15%	25%	54%
Addison Road (north of Bicester to Bletchley rail line, Steeple Claydon)	NB	68	1	78	1	85	1	105	2	10	17	37	15%	25%	54%
	SB	77	0	89	0	97	0	119	0	12	20	42	15%	25%	54%
Main Street (north of	NB	39	4	45	5	49	5	60	6	6	10	21	15%	25%	54%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
School Hill, Charndon)	SB	31	1	36	1	39	1	48	2	5	8	17	15%	25%	54%
Perry Hill (north of School Hill, Calvert)	NB	84	1	96	2	105	2	129	2	12	21	45	15%	25%	54%
	SB	92	4	105	4	115	5	141	6	13	23	49	15%	25%	54%
West Street (east of Perry Hill, Twyford)	EB	41	0	47	0	51	0	63	1	6	10	22	15%	25%	54%
	WB	66	0	76	0	83	0	102	1	10	17	36	15%	25%	54%
West Street (west of Perry Hill, Steeple Claydon)	EB	62	1	71	1	77	1	95	1	9	15	33	15%	25%	54%
	WB	63	1	72	1	79	1	97	2	9	16	34	15%	25%	54%
Main Street (Charndon)	EB	54	4	62	5	67	5	83	6	8	13	29	15%	25%	54%
	WB	63	2	72	2	79	2	97	3	9	16	34	15%	25%	54%
Portway Road (Twyford)	NB	70	3	80	3	87	4	108	5	10	17	38	15%	25%	54%
	SB	81	7	93	8	101	9	125	11	12	20	44	15%	25%	54%
Perry Hill (north of West Street, Steeple Claydon)	EB	130	8	149	9	162	10	200	12	19	32	70	15%	25%	54%
	WB	123	9	141	10	154	11	189	14	18	31	66	15%	25%	54%
The Green, Manthorn Farm (Chetwode)	NB	4	0	5	0	5	0	6	0	1	1	2	15%	25%	54%
	SB	4	0	5	0	5	0	7	0	1	1	3	15%	25%	54%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
School End (Chetwode)	NB	5	1	6	1	6	1	8	1	1	1	3	15%	25%	54%
	SB	7	0	8	0	9	0	11	0	1	2	4	15%	25%	54%
Manor Farm Road (Barton Hartshorn)	NB	22	0	24	0	26	0	30	0	2	4	8	11%	19%	38%
	SB	15	0	17	0	18	0	21	0	2	3	6	11%	19%	38%
Buckingham Rd/Gawcott Road (Gawcott)	EB	159	2	182	8	196	8	236	2	23	37	77	15%	24%	49%
	WB	96	1	110	6	119	6	143	1	14	23	47	15%	24%	49%
Barton Road (between Manor Farm Road and A421, Barton Hartshorn)	NB	19	3	22	3	24	3	29	4	3	5	10	15%	24%	49%
	SB	15	2	17	3	19	3	23	3	2	4	8	15%	24%	49%

Table 7-122: Calvert, Steeple Claydon, Twyford and Chetwode local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
School Hill (east of Brackley Lane, Calvert)	EB	140	1	162	1	177	1	222	1	22	37	82	16%	26%	58%
	WB	94	5	109	6	119	7	149	8	15	25	55	16%	26%	58%
School Hill (west of Brackley Lane, Calvert)	EB	93	0	107	0	117	0	146	1	14	24	53	16%	26%	58%
	WB	111	0	128	0	140	0	175	0	17	29	64	16%	26%	58%
Perry Hill (south of School Hill, Calvert)	NB	176	3	203	3	223	4	279	5	27	47	103	16%	26%	58%
	SB	100	6	116	7	126	8	158	9	16	26	58	16%	26%	58%
School Hill (west of Perry Hill, Calvert)	EB	74	3	86	3	94	4	117	5	12	20	43	16%	26%	58%
	WB	48	3	55	3	61	4	76	5	7	13	28	16%	26%	58%
School Hill east of Addison Road, Calvert)	EB	80	3	92	3	101	4	127	5	12	21	47	16%	26%	58%
	WB	68	0	79	0	86	0	108	0	11	18	40	16%	26%	58%
Addison Road (south of Bicester to Bletchley rail line, Steeple Claydon)	NB	98	0	113	0	124	0	155	0	15	26	57	16%	26%	58%
	SB	57	0	66	0	72	0	90	0	9	15	33	16%	26%	58%
Addison Road (north of Bicester to Bletchley rail line, Steeple Claydon)	NB	98	0	113	0	124	0	155	0	15	26	57	16%	26%	58%
	SB	57	0	66	0	72	0	90	0	9	15	33	16%	26%	58%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Main Street (north of School Hill, Charndon)	NB	52	5	60	6	66	6	82	8	8	14	30	16%	26%	58%
	SB	51	3	59	3	64	4	81	5	8	13	30	16%	26%	58%
Perry Hill (north of School Hill, Calvert)	NB	95	1	110	1	120	1	151	1	15	25	56	16%	26%	58%
	SB	61	2	70	3	77	3	96	4	9	16	35	16%	26%	58%
West Street (east of Perry Hill, Twyford)	EB	78	0	90	0	98	0	123	0	12	20	45	16%	26%	58%
	WB	47	0	54	0	60	0	75	0	7	13	28	16%	26%	58%
West Street (west of Perry Hill, Steeple Claydon)	EB	77	0	89	0	97	1	122	1	12	20	45	16%	26%	58%
	WB	70	1	80	1	88	1	110	1	10	18	40	16%	26%	58%
Main Street (Charndon)	EB	87	4	101	5	110	5	138	6	14	23	51	16%	26%	58%
	WB	59	2	68	2	75	3	93	3	9	16	34	16%	26%	58%
Portway Road (Twyford)	NB	80	3	92	3	101	4	127	5	12	21	47	16%	26%	58%
	SB	87	5	101	6	110	6	138	8	14	23	51	16%	26%	58%
Perry Hill (north of West Street, Steeple Claydon)	EB	134	2	155	2	169	3	212	3	21	35	78	16%	26%	58%
	WB	113	8	131	9	143	10	179	13	18	30	66	16%	26%	58%
The Green, Manthorn Farm (Chetwode)	NB	3	0	3	0	4	0	4	0	0	1	1	16%	26%	58%
	SB	4	0	5	0	5	0	6	0	1	1	2	16%	26%	58%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
School End (Chetwode)	NB	9	0	11	0	12	0	15	0	2	3	6	16%	26%	58%
	SB	7	0	8	0	8	0	10	0	1	1	3	16%	26%	58%
Manor Farm Road (Barton Hartshorn)	NB	22	0	25	0	26	0	31	0	3	4	9	12%	20%	41%
	SB	14	0	15	0	16	0	19	0	1	2	5	12%	20%	41%
Buckingham Rd/Gawcott Road (Gawcott)	EB	94	0	109	1	118	1	144	0	15	24	50	15%	25%	53%
	WB	122	0	140	1	152	2	186	0	18	30	64	15%	25%	53%
Barton Road (between Manor Farm Road and A421, Barton Hartshorn)	NB	23	2	26	2	28	3	35	3	3	5	12	15%	25%	53%
	SB	12	1	13	2	15	2	18	2	1	3	6	15%	25%	53%

Rail

- 7.9.40 The proposed future East West Rail Link will provide a strategic railway connection between East Anglia and Central, Southern and Western England. It will use the Oxford to Bicester Line, a renovated section of the Bicester to Bletchley Line, and finally the Marston Vale Line from Bletchley to Bedford. It is expected to be fully operational by 2019.
- 7.9.41 East West Rail Link passenger services between Milton Keynes and Aylesbury are expected to commence operating on the upgraded Aylesbury Link alongside the Proposed Scheme from December 2017 with a service frequency of one train per hour in each direction. Future operations at the Calvert landfill site and potentially the Greatmoor EfW facility may also result in an increase in freight trains using this section of line of up to six trains per day. Some of these may arrive and depart via the Bicester to Bletchley Line in the study area.

Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) Proposed Scheme construction description

Construction activities

- 7.9.42 The major construction elements within the study area are as follows:
- Calvert cutting and Aylesbury Link realignment;
 - Calvert IMD and Bicester to Bletchley Line realignment;
 - Twyford viaduct and adjacent earthworks;
 - Godington east and west viaducts and adjacent embankments; and
 - Chetwode cutting and Barton Hartshorn embankment.
- 7.9.43 Details of the construction phasing are provided in Volume 2, Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-12

Figure 7-12: Calvert, Steeple Claydon, Twyford and Chetwode construction activity phasing

Construction activity (Summary)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	quarters									
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4										
Advance works										
Advance works										
Civil engineering works										
School Hill Green Overbridge Satellite Compound (0270/01)										
West Street Overbridge Main Compound (0270/02)										

Construction activity (Summary)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	quarters									
	1	2	3	4	1	2	3	4	1	2
Chetwode Cutting Satellite Compound (0270/03)										
Rail infrastructure and systems works										
Calvert Railhead Main Compound (013/104)										
IMD Reception sidings satellite compound (013/103)										
Bicester to Bletchley Line satellite compound (013/105)										
Aylesbury Link Line satellite compound (013/102)										
School Hill Green Overbridge satellite compound (0270/01)										
Chetwode ATS satellite compound (013/106)										
Commissioning										
Commissioning (until end 2026)										

Compounds and construction sites

- 7.9.44 Main site compounds would be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds would generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.9.45 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-123Table 7-79. There are no compounds within the study area with shift working (24 hours).
- 7.9.46 The location of compounds is shown on Maps CT-05-054 to CT-05-058-L1 (Volume 2, Map Book 13).

Table 7-123: Calvert, Steeple Claydon, Twyford and Chetwode assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Main	West Street overbridge	129	386
Main	Calvert railhead	110	450
Satellite	IMD reception sidings	68	95
Satellite	Bicester to Bletchley Rail Line (rail systems)	36	48
Satellite	School Hill green overbridge	91	189
Satellite	Aylesbury Link Line	36	48
Satellite	Chetwode cutting	130	293
Satellite	Chetwode auto-transformer station	26	38

Construction trip assumptions

Trip generation

- 7.9.47 The duration of when there will be busy transport activity at each site is shown in Table 7-124. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-124: Calvert, Steeple Claydon, Twyford and Chetwode typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Main	West Street overbridge	Perry Hill, Buckingham Road, Grendon Road, Edgcott Road, The Broadway and A41 and/or Buckingham Road, Gawcott Road and A421 and/or Perry Hill, Hillesdon Road, Gawcott Road, A421 Tingewick Road	2016	Six years and nine months	38 months	650-1,240	470-1,240
Main	Calvert railhead	2018	Eight years				
Satellite	IMD reception sidings	2018	Two years				
Satellite	Bicester to Bletchley Rail Line (rail systems)	Rail access only via existing Bicester to Bletchley Line	2019	10 months	N/A	N/A	N/A
Satellite	School Hill green overbridge	Perry Hill, Buckingham Road, Grendon Road, Edgcott Road, The Broadway and A41 and/or Perry Hill, Hillesdon Road, Gawcott Road, A421 Tingewick Road	2016	Seven years and three months	37 months	230-320	30-40
Satellite	Aylesbury Link Line	2019	One year and nine months				
Satellite	Chetwode cutting	School End, A421 Tingewick Road	2017	Two years and nine months	14 months	120-190	10-40
Satellite	Chetwode auto-transformer station	Private access to Manthorn Farm, School End, A421 Tingewick Road	2021	One year and six months			

7.9.48 Information on the indicative construction programme is provided in Figure 7-12, which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-124. Consequently the peak traffic movements presented will not generally occur at the same time, although in some instances there may be some overlap.

7.9.49 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment

7.9.50 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;
- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network; and
- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

7.9.51 Within the study area, mass-haul movements have been assigned to A41 (between M40 and boundary with CFA12), A421 (between Gawcott Road and boundary with CFA14), Perry Hill (between boundary with CFA12 and Gawcott), Buckingham Road/Gawcott Road (between Gawcott and A421) and a short section Addison Road (also known as Pond Lane) over the Bicester to Bletchley Line).

7.9.52 Within the study area, construction traffic has been assigned to the roads listed in the construction lorry routes section below. Workforce traffic has been assigned to these same roads and additionally to School Hill, Addison Road (also known as Pond Lane), Main Street, West Street, and Portway Road.

- 7.9.53 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.
- 7.9.54 From the neighbouring area to the north, the Newton Purcell to Brackley (CFA14) area, the cumulative construction daily traffic flows of approximately 190 cars/LGVs per day (two-way) and 10 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to the A421 and A4421.
- 7.9.55 From neighbouring area to the south, including Waddesdon and Quanton (CFA12) and the Stoke Mandeville and Aylesbury (CFA11) areas, the cumulative construction daily traffic flows of approximately 140 cars/LGVs per day (two-way) and 30 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to A41.

Construction lorry routes

- 7.9.56 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Map TR-03-057 (Volume 5, Map Book 71):
- West Street overbridge and Calvert railhead main compounds and IMD reception sidings satellite compound will be accessed via Perry Hill, Buckingham Road, Grendon Road, Edgcott Road, The Broadway, A41 and/or Perry Hill, Buckingham Road/Gawcott Road, A421 Tingwick Road;
 - Bicester to Bletchley Rail Line (rail systems) satellite compound will be rail access only via existing Bicester to Bletchley Line;
 - School Hill green overbridge and Aylesbury Link Line satellite compounds will be accessed via Perry Hill, Buckingham Road, Grendon Road, Edgcott Road, The Broadway, A41 and/or Perry Hill, Buckingham Road/Gawcott Road, A421 Tingwick Road;
 - Chetwode cutting satellite compound will be accessed via School End, Barton Hartshorn Road/Barton Road, A421 Tingwick Road; and
 - Chetwode auto-transformer station satellite compound will be accessed via a private access to Manthorn Farm, School End, Barton Hartshorn Road/Barton Road, A421 Tingwick Road.

Traffic management, road closures and diversions

- 7.9.57 The roads in the study area that will be subject to temporary closure during construction of the Proposed Scheme are summarised in Table 7-125.

- 7.9.58 The approximate length of diversions listed is the 'worst case' scenario based on the maximum distance from one side of the road closure to the other. In reality, a proportion of vehicles diverted will be subject to a diversion distance less than what is reported.

Table 7-125: Calvert, Steeple Claydon, Twyford and Chetwode temporary road closures and diversions

Name	Location	Location (chainage)	Diversion route	Approximate length of diversions	Programme	Duration
School Hill	Calvert	079+100	Addison Road (also known as Pond Lane), West Street and Perry Hill.	6.9km	Nov 2018	Up to two years
West Street	Calvert	081+200	Realigned Perry Hill, Main Street and School Hill	4.3km	Sep 2017	Up to one year and six months
School End	Chetwode	086+450	Manor Farm Lane, A4421 and Watergate Farm Lane	6.9km	Jan 2018	Up to one year and six months

- 7.9.59 The temporary diversions will affect approximately 2,460 vehicles a day (12 hour 2021 base flow) on School Hill, approximately 1,440 vehicles a day on West Street and approximately 170 vehicles a day on School End.

- 7.9.60 Addison Road (also known as Pond Lane), Perry Hill, The Green (highway adjacent to Sunflower Farm) and The Green access road to Manthorn Farm are to be realigned. However construction of the new roads will be carried out 'off-line', meaning that the existing roads will remain open with no diversion of traffic required until the new off-line sections of road are complete. Traffic management and/or very short term closures i.e. overnight, off-peak or weekend, may be required to tie the new off-line sections of road into the existing roads immediately before switchover, although these are not considered to have a substantial impact upon motorised users.

PRoW closures and diversions

- 7.9.61 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-126.
- 7.9.62 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.
- 7.9.63 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-054 to CT-05-058-L1 (Volume 2, Map Book 13).

Table 7-126: Calvert, Steeple Claydon, Twyford and Chetwode temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
SCL/18/2 (public bridleway)	Calvert	077+450	Oct 2017	250m Up to 13 months	Construction of Calvert Green Overbridge Temporary diversion to the west.
School Hill	Calvert	079+100	Nov 2018	3km Up to two years	Construction of School Hill Overbridge Temporary diversion via SCL/12/1, SCL/13/2, SCL/18/2 and SCL/18/1.
SCL/7/1 (public footpath)	Calvert	079+200	Sep 2016	1.8km Up to one year	Construction of IMD Reception Sidings and the East West rail overbridge Temporary diversion via SCL/8/2 and Addison Road during works.
SCL/7/2 (public footpath)	Calvert	079+200	Sep 2016	1.8km Up to one year	Construction of IMD Reception Sidings and the East West rail overbridge Temporary diversion via SCL/8/2 and Addison Road during works.
SCL/8/1 (public footpath)	Calvert	079+200	Sep 2016	700m Up to one year	Construction of Footpath SCL/8, IMD Reception Sidings and the East West rail overbridge Temporary diversion via SCL/8/2 and Addison Road during works.
SCL/9/1 (public footpath)	Calvert	079+200	Sep 2016	1.8km Up to one year	Construction of Footpath SCL/8, IMD Reception Sidings and the East West rail overbridge. Temporary diversion via SCL/8/2 and Addison Road during works.
TWY/4/1 (public footpath)	Calvert	080+200	Sep 2016	100m Up to nine months	Construction of East West rail overbridge Temporary diversion along the west of the temporary stockpiles and crossing at Main Street to the eastern side of the railway line.
SCL/6/1 (public footpath)	Calvert	080+820	Sep 2016	1.5km 12 months	Construction of IMD Sidings Temporary diversion to West Street and realigned Perry Hill.
West Street	Calvert	081+200	Sep 2017	800m Up to one year and six months	Construction of West Street Overbridge Temporary diversion via footpath TWY/19/3 and TWY/18/2.
TWY/18/2 (public footpath)	Calvert	081+500	June 2018	150m Up to six months	Flood compensation Temporary diversion along existing track to join TWY/16/2
TWY/19/3 (public	Twyford	081+850	Aug 2019	250m	Flood compensation

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
footpath)				Up to six months	Temporary diversion along existing track to join TWY/16/2
PBI/5A/3 (public footpath)	Twyford	083+100	Apr 2018	800m Up to one year	Construction of PBI/5 Accommodation Overbridge Temporary diversion to the east of existing alignment across PBI/5 accommodation overbridge during construction.
PBI/9/3 (public footpath)	Godington	84+000	Jan 2018	50m Up to one year and six months	Construction of Godington East Viaduct Temporary diversion around the eastern boundary of the construction site.
CHW/225/5/10 (public footpath)	Godington	084+350	May 2019	100m Up to six months	Flood compensation Temporary diversion to the east
CHW/225/4/10 (public footpath)	Godington	084+375	May 2019	250m Up to six months	Flood compensation Temporary diversion to the east
CHW/24/2 (public footpath)	Godington	084+400	Jan 2018	300m Up to one year and six months	Construction of Godington West Viaduct Temporary diversion to the west of the original alignment
School End	Chetwode	086+450	Jan 2018	200m Up to one year	Construction of School End Overbridge Temporary diversion to CHW/11/1 during construction of the overbridge.
BHA/3/1 (public footpath)	Godington	087+200	Aug 2019	200m Up to one year	Barton Hartshorn Embankment Temporary diversion around Barton to Mixbury cutting construction stockpile

7.9.64 The following PRoW will be temporarily diverted by a negligible distance during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:

- SCL/13/2 (public footpath);
- SCL/12/1 (public footpath);
- TWY/17/1 (public footpath); and
- BHA/2/2 (public footpath).

7.9.65 The following PRoW remain open during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:

- Addison Road;
- Perry Hill;
- TWY/16/1 (public footpath);
- PBI/6/3 (public footpath);
- PBI/6/2 (public footpath);
- PBI/5(F)/7 (public footpath) and watercourse;
- "The Green";
- CHW/18/1 (public footpath);
- CHW/11/1 (public footpath); and
- BHA/2/2 (public footpath).

7.9.66 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:

- SCL13/2 (public footpath);
- Addison Road;
- SCL7/1 (public footpath);
- SCL7/2 (public footpath);
- SCL9/1 (public footpath);
- TWY/4/1 (public footpath);
- SCL/6/1 (public footpath);
- TWY/18/2 (public footpath);
- TWY/16/1 (public footpath);
- TWY/17/1 (public footpath);
- PBI/6/3 (public footpath);
- PBI/6/2 (public footpath);
- Godington viaduct Footpath PBI/9/3 (public footpath);
- CHW/18/1 (public footpath);
- CHW/11/1 (public footpath);

- BHA/3/1 (public footpath); and
- BHA/2/2 (public footpath).

Utilities works

- 7.9.67 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area. Minor utilities works are expected to result in only localised traffic and pedestrian diversions, which will be of short-term duration. No additional substantial impacts from these works are expected due to utilities works.
- 7.9.68 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Major highways within the study area which will be affected by utility works are:
- School Hill.

Avoidance and mitigation measures

- 7.9.69 The following measures have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce adverse impacts on transport users:
- a temporary railhead will be provided at Calvert to allow construction materials, including excavated materials, , and equipment to be transported by rail where reasonably practicable and thereby reduce HGV road movements;
 - transporting construction materials and equipment within and along the route of the Proposed Scheme, where reasonably practicable, to reduce lorry movements on the public highway;
 - the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in reduced diversions of traffic onto alternative routes;
 - providing temporary alternative routes where reasonably practicable to maintain connectivity for PRoW closed during construction;
 - HGV routeing, as far as reasonably practicable, along the strategic road network

and using designated routes for access, as shown on Map TR-03-057 (Volume 5, Traffic and Transport Map Book); and

- reducing daily travel by site workers by providing on site accommodation and welfare facilities.

7.9.70 The draft CoCP (see Volume 5: Appendix CT-003-000/1) includes measures which seek to reduce the adverse impacts of deliveries of construction materials and equipment, including construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.9.71 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan⁷ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with the construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where reasonably practicable, particularly in the rural context, this will encourage the use of sustainable modes of transport or vehicle sharing.

7.9.72 The reductions in traffic generation arising from the Travel Plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.

7.9.73 The measures in the draft CoCP (Section 14) includes clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impacts of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during construction of the Proposed Scheme on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.

7.9.74 Specific measures will include:

- the core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will, therefore, generally arrive before the morning peak hour and depart after the evening peak hour (although the assessment has assumed that some work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5). During railway installation works the temporary railhead at Calvert will operate 24 hours a day. It is anticipated that shift changeover times will not coincide with the highway peak hours; and

⁷ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective

- excavated material will be reused, where reasonably practicable, along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15). The reductions in traffic generation arising from the travel plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.

- 7.9.75 Rail replacement services will be provided when rail possessions are in place on the East West Rail Line. Where practicable rail possessions will be scheduled to coincide with other planned rail possessions for engineering and maintenance works on the same line to minimise additional disruption to rail users.
- 7.9.76 No other mitigation measures during construction of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) construction impacts

Key construction transport issues

- 7.9.77 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.
- construction vehicle movements to and from the construction site compounds;
 - temporary road closures and associated diversions of motorised users;
 - temporary road closures and associated diversions of bus services;
 - temporary PRoW closures and associated diversions of non-motorised users; and
 - short-term possessions of the Aylesbury Link.
- 7.9.78 No substantial traffic and transport impacts are expected on waterways and canals, public transport interchanges, parking and loading, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.9.79 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.
- 7.9.80 There are no strategic road network links in the study area where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more during construction of the Proposed Scheme.
- 7.9.81 During the construction period there will be a number of roads within the local network that will be affected by the proposed highway works including:

- School Hill – temporary road closure and diversion of motorised users, to allow construction of School Hill green overbridge;
- West Street - temporary road closure and diversion of motorised users, to allow construction of West Street overbridge; and
- School End - temporary road closure and diversion of motorised users, to allow construction of School End overbridge.

The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-127 and Table-129 for AM peak and PM peak flows respectively.

Table 7-127: Calvert, Steeple Claydon, Twyford and Chetwode local road network construction traffic flows (vehicles) - AM peak

Location	Direction	2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
School Hill (between Brackley Lane and Addison Road)	EB	134	154	189	5	35	3	23%	149%
	WB	114	130	204	12	73	3	56%	35%
School Hill (between Brackley Lane and Perry Hill)	EB	125	144	230	5	86	3	60%	242%
	WB	107	123	145	4	22	3	18%	370%
Perry Hill (between School Hill and Edgecott)	NB	110	126	317	76	191	71	151%	1294%
	SB	167	192	270	74	78	71	41%	2228%
School Hill (between Perry Hill and Main Street)	EB	56	64	152	6	88	1	137%	20%
	WB	70	80	153	7	72	1	90%	20%
School Hill (east of Addison Road)	EB	84	96	109	6	13	0	13%	0%
	WB	58	67	67	2	0	0	0%	0%
Addison Road (south of Bicester to Bletchley rail line)	NB	68	78	113	4	35	3	45%	284%
	SB	77	89	123	3	35	3	39%	1367%
Addison Road (north of Bicester to Bletchley rail line)	NB	68	78	109	2	31	0	39%	35%
	SB	77	89	119	1	30	0	34%	121%
Main Street (between School Hill and Portway Road)	NB	39	45	45	5	0	0	0%	0%
	SB	31	36	73	1	37	0	105%	0%
Perry Hill (between School Hill and West Street)	NB	84	96	432	75	335	73	348%	4547%
	SB	92	105	373	80	268	76	255%	1690%
West Street (between Perry Hill	EB	41	47	47	0	0	0	0%	0%

and Steeple Claydon)	WB	66	76	133	0	57	0	75%	0%
West Street (between Perry Hill and Portway Road)	EB	62	71	128	1	57	0	81%	0%
	WB	63	72	72	1	0	0	0%	0%
Main Street (south of School Hill)	NB	54	62	99	5	37	0	60%	0%
	SB	63	72	72	2	0	0	0%	0%
Portway Road	EB	70	80	118	3	37	0	46%	0%
	WB	81	93	93	8	0	0	0%	0%
Perry Hill (between West Street and Gawcott)	NB	130	149	170	30	20	20	14%	222%
	SB	123	141	208	31	67	20	47%	197%
The Green, Manthorn Farm	NB	4	5	5	0	0	0	0%	0%
	SB	4	5	5	0	0	0	0%	0%
School End/Watergate Farm Lane	NB	5	6	43	4	38	3	673%	310%
	SB	7	8	46	3	38	3	452%	0%
Manor Farm Lane	EB	22	24	29	1	6	1	24%	0%
	WB	15	17	25	0	8	0	50%	0%
Buckingham Rd/Gawcott Road	NB	159	182	202	22	20	20	11%	1110%
	SB	96	110	150	21	39	20	35%	1974%
Barton Hartshorn Road/Barton Road	NB	19	22	26	6	4	3	19%	94%
	SB	15	17	55	5	38	3	217%	113%

Table 7-128: Calvert, Steeple Claydon, Twyford and Chetwode local road network construction traffic flows (vehicles) - PM peak

Location	Direction	2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
School Hill (between Brackley Lane and Addison Road)	EB	140	162	251	2	89	1	55%	143%
	WB	94	109	130	7	21	1	19%	19%
School Hill (between Brackley Lane and Perry Hill)	EB	93	107	147	2	40	1	37%	299%
	WB	111	128	198	1	70	1	54%	323%
Perry Hill (between School Hill and Edgecott)	NB	176	203	281	73	77	70	38%	2015%
	SB	100	116	303	77	188	70	162%	1007%
School Hill (between Perry Hill and Main Street)	EB	74	86	174	4	89	0	104%	13%
	WB	48	55	152	4	97	1	174%	20%

School Hill (east of Addison Road)	EB	80	92	92	3	0	0	0%	0%
	WB	68	79	91	0	12	0	15%	0%
Addison Road (south of Bicester to Bletchley rail line)	NB	98	113	165	1	52	1	46%	0%
	SB	57	66	87	1	21	1	32%	970%
Addison Road (north of Bicester to Bletchley rail line)	NB	98	113	164	0	51	0	45%	0%
	SB	57	66	85	0	19	0	30%	145%
Main Street (between School Hill and Portway Road)	NB	52	60	96	6	36	0	60%	0%
	SB	51	59	59	3	0	0	0%	0%
Perry Hill (between School Hill and West Street)	NB	95	110	467	71	357	71	325%	10190%
	SB	61	70	307	76	237	73	338%	2748%
West Street (between Perry Hill and Steeple Claydon)	EB	78	90	145	0	55	0	62%	0%
	WB	47	54	54	0	0	0	0%	0%
West Street (between Perry Hill and Portway Road)	EB	77	89	89	0	0	0	0%	0%
	WB	70	80	136	1	55	0	69%	0%
Main Street (south of School Hill)	NB	87	101	101	5	0	0	0%	0%
	SB	59	68	104	2	36	0	52%	0%
Portway Road	EB	80	92	92	3	0	0	0%	0%
	WB	87	101	136	6	36	0	36%	0%
Perry Hill (between West Street and Gawcott)	NB	134	155	220	22	65	19	42%	838%
	SB	113	131	150	29	19	19	15%	209%
The Green, Manthorn Farm	NB	3	3	3	0	0	0	0%	0%
	SB	4	5	5	0	0	0	0%	0%
School End/Watergate Farm Lane	NB	9	11	44	1	33	1	314%	0%
	SB	7	8	41	1	33	1	444%	822%
Manor Farm Lane	EB	22	25	35	0	11	0	43%	0%
	WB	14	15	23	0	8	0	50%	0%
Buckingham Rd/Gawcott Road	NB	94	109	146	19	38	19	35%	16798%
	SB	122	140	160	19	19	19	14%	0%
Barton Hartshorn Road/Barton Road	NB	23	26	60	3	33	1	127%	39%
	SB	12	13	15	3	1	1	11%	59%

- 7.9.82 In addition to the traffic flows presented in the tables, a short section of Addison Road over the Bicester to Bletchley Line will be used to transport excavated material from the Calvert railhead, where it will have been delivered by train, to a sustainable placement area. The number of HGVs on this short section of Addison Road will be up to 1,052, between January 2019 and December 2020.
- 7.9.83 Roads on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users (although in addition may also have an increase in other traffic generated by the construction of the Proposed Scheme) are:
- Addison Road (also known as Pond Lane), West Street (between Addison Road and Perry Hill) and Perry Hill (between West Street and School Hill), for up to two years from November 2018;
 - Realigned Perry Hill, School Hill (between Perry Hill and Main Street) and Main Street (between School Hill and West Street), for up to one year and six months from September 2017; and
 - Manor Farm Lane (between School End and A4421), A4421 (between Manor Farm Lane and Watergate Farm Lane) and Watergate Farm Lane (between A4421 and School End), for up to one year and six months from January 2018.
- 7.9.84 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- Perry Hill (between boundary with CFA12 and Gawcott);
 - Buckingham Road/Gawcott Road (between Gawcott and A421);
 - A short section of Addison Road (over the Bicester to Bletchley Line;) and
 - A421 (between Gawcott Road and boundary with CFA14).
- 7.9.85 The HGVs used for the transportation of construction materials and equipment will use designated lorry routes as described in Section 7.9.56. Workforce traffic has been assigned to the same roads and additionally School Hill, Addison Road, Main Street, West Street and Portway Road. Some of these roads may also have an increase in other Proposed Scheme traffic.

Junction performance

- 7.9.86 The implementation of the draft CoCP (see Volume 5: Appendix CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

- 7.9.87 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.
- 7.9.88 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:
- A421 with A4421 and Sandpit Hill;
 - Barton Road with A421;
 - Perry Hill with West Street;
 - Perry Hill with School Hill; and
 - Buckingham Road/Gawcott Road with A421.
- 1.1.2 Of the junctions above, Barton Road with A421, Perry Hill with West Street, Perry Hill with School Hill and Buckingham Road/Gawcott Road with A421 are priority junctions. The 2021 traffic flows with Proposed Scheme traffic (in PCU) at the junctions of Perry Hill with West Street and Perry Hill with School Hill are shown in Table 7-129 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

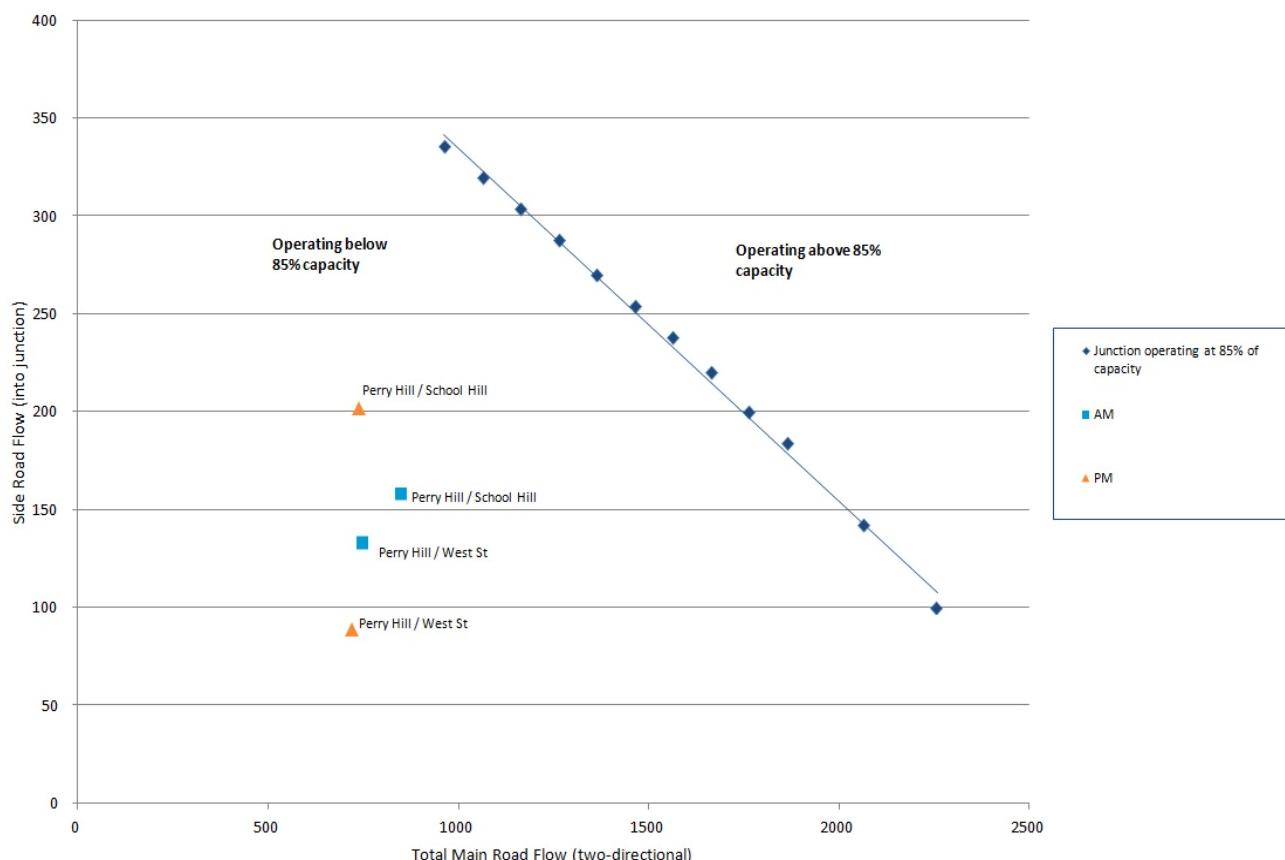
Table 7-129: Calvert, Steeple Claydon, Twyford and Chetwode priority junction flows

Junction	2021 With HS2 construction traffic			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
Perry Hill/West Street	745	133	717	89
Perry Hill/School Hill	847	158	736	202

- 7.9.89 Traffic flow data on the A421, east of A4421, is not available, therefore qualitative assessment has been carried out for both Barton Road with A421 and Buckingham Road/Gawcott Road with A421 junctions, as outlined later in this section.
- 7.9.90 The junction of Perry Hill with School Hill has been plotted on a graph, shown in Figure 7-13, that shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

- 7.9.91 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-13: Calvert, Steeple Claydon, Twyford and Chetwode priority junction assessment 2021



- 7.9.92 The graph illustrates that the junctions of Perry Hill with School Hill and Perry Hill with West Street fall below the 'threshold' of capacity during both AM and PM peaks and are therefore not forecast to be close to their theoretical capacity of 85% during construction of the Proposed Scheme. As a result, it is not considered to warrant individual assessment and has therefore not been assessed with junction assessment software.

7.9.93 A qualitative assessment has been carried out for the A421 with A4421 and Sandpit Hill, Barton Road with A421 and Buckingham Road/Gawcott Road with A421 non-priority junctions, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows(including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.

7.9.94 The assessment indicates that increased traffic during the most intensive periods of construction is unlikely to cause additional intermittent traffic congestion and delay at the following junctions during peak periods:

- Barton Road with A421; and
- Buckingham Road (Gawcott Road) with A421.

7.9.95 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the following junction during peak periods:

- A421 with A4421 and Sandpit Hill.

Accidents and safety

7.9.96 The Proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Rail

7.9.97 The Aylesbury Link is a single track freight only line and is a continuation of the Marylebone to Aylesbury Line which terminates at Aylesbury Vale Parkway station. Freight services operate on the line at a frequency of approximately two trains per day.

7.9.98 Within the study area, the Aylesbury Link runs to the east and parallel to the Proposed Scheme, en route to Calvert where there is a waste depot. Beyond Calvert, there is a junction; one line goes east and joins the Oxford to Cambridge Line, while the main line goes north and becomes the dismantled GCML.

7.9.99 The construction of the Proposed Scheme in this study area will require temporary possessions on the Aylesbury Link for various road, rail and bridleway overbridge works and bridge demolition. Table 7-130 summarises the possessions which are forecast to be required.

Table 7-130: Calvert, Steeple Claydon, Twyford and Chetwode summary of rail possessions required - Aylesbury Link

Element name	Location (chainage)	Description of works	Number of possessions	Type	Duration	Year/Duration
Calvert	077+400 & 078+250 & 079+100 & 079+200	Civil engineering works relating to road, rail and bridleway overbridge works and bridge demolition.	8	All line block	54hr possession	2017-2019
			10	All line block	27hr possession	
		Interface with Network Rail works	8	All line block	54hr possession	2017-2019
			10	All line block	27hr possession	
			281	All line block	Mid-week day and night	2018-2021

- 7.9.100 East West Rail passenger services from Reading to Milton Keynes via Oxford, and Reading to Bedford via Oxford are expected to commence operating on the Bicester to Bletchley Line in December 2017 with a combined service frequency of two trains per hour in each direction.
- 7.9.101 Within the study area, East West Rail will use the renovated Bicester to Bletchley Line which runs through Calvert, to the south of the IMD, in an east to west direction.
- 7.9.102 The construction of the Proposed Scheme in this study area will require temporary possessions on the East West Rail Link for various road, rail and bridleway overbridge works and bridge demolition. Table 7-131 summarises the possessions which are forecast to be required.

Table 7-131: Calvert, Steeple Claydon, Twyford and Chetwode summary of rail possessions required - East West Rail

Element name	Location (chainage)	Description of works	Number of possessions	Type	Duration	Year/Duration
East West Rail overbridge and Charndon Lodge underbridge	080+125 & 080+175	Civil engineering works relating to East West Rail overbridge and Charndon Lodge underbridge	2	All line block	54hr possession	2018-2019
			4	All line block	27hr possession	

- 7.9.103 Between January 2019 and December 2020, 41 trains a week will run to Calvert via the Aylesbury Link as part of the mass-haul strategy, carrying 1.7 million cubic metres of material. Sufficient train paths will available to enable this quantity of mass-haul movement via rail without impacting on East West Rail passenger services.

Local bus and coach

- 7.9.104 The temporary closure of School Hill and West Street will require the diversion of several bus services onto alternative routes.
- 7.9.105 Table 7-132 shows the services that would be affected by temporary road closures and the likely diversion involved. Note that the number 16 and 135 bus services are affected by the closure of more than one road each, and are therefore assessed twice. The two road closures of School Hill and West Street will not happen concurrently, to ensure a diversion route is available for the bus services. The approximate additional journey time from start to end of route as a result of diversions has been recorded based upon average speed of service and length of diversion.

Table 7-132: Calvert, Steeple Claydon, Twyford and Chetwode temporary local bus/coach diversions

Bus/Coach service	Impact	Combined Service Frequency (potential max per hour)	Diversion route	Approximate length of diversions	Approximate additional journey time (start to end of route)
Bus service No. 16	Temporary closure of School Hill, requiring a diversion of the bus service	One	Via West Street.	2.5km	4min
Bus service No. 16	Temporary closure of West Street, requiring a diversion of the bus service	One	Via School Hill through Charndon.	2km	3.5min
Bus service No. 18	Temporary closure of School Hill, requiring a diversion of the bus service	One	Via Perry Hill and West Street.	2.5km	6min
Bus service No. 135	Temporary closure of School Hill, requiring a diversion of the bus service	One	Via Perry Hill and West Street.	2.5km	3.5min
Bus service No. 135	Temporary closure of West Street requiring a diversion	One	Via Perry Hill and School Hill through Charndon.	3.45km	5min

- 7.9.106 Bus service 133, operated by Redline Buses, on Tuesdays at a frequency of one service per hour, currently travels along School End, between Barton Hartshorn and Chetwode. Whilst School End will be temporarily closed, the section of School End on which the bus service travels will remain open during the construction of the Proposed Scheme and the service will not be impacted.
- 7.9.107 Other bus and coach services will not be impacted by construction of the Proposed Scheme except as a result of potential additional traffic congestion and delay at locations identified above.

Pedestrians, cyclists and equestrians

- 7.9.108 The review of PRoW links indicates there will be additional walking distances on 18 routes due to temporary realignments, with eight of these realigned links requiring a diversion of more than 500m.
- 7.9.109 Table 7-133 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.9.110 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-054 to CT-05-058-L1 (Volume 2, Map Book 13).

Table 7-133: Calvert, Steeple Claydon, Twyford and Chetwode summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
SCL/18/2 (public bridleway)	Calvert	077+450	Construction of Calvert Green Overbridge	Temporary diversion to the west	3	250m	3min
School Hill	Calvert	079+100	Construction of School Hill Overbridge	Temporary diversion via SCL/12/1, SCL/13/2, SCL/18/2 and SCL/18/1.	28	3km	36min
SCL/7/1 (public footpath)	Calvert	079+200	Construction of IMD Reception Sidings and the East West rail overbridge	Temporary diversion via SCL/8/2 and Addison Road during works.	No data available	1.8km	21min
SCL/7/2 (public footpath)	Calvert	079+200	Construction of IMD Reception Sidings and the East West rail overbridge	Temporary diversion via SCL/8/2 and Addison Road during works.	No data available	1.8km	21min
SCL/8/1 (public footpath)	Calvert	079+200	Construction of Footpath SCL/8, IMD Reception Sidings and the East West rail overbridge	Temporary diversion via SCL/8/2 and Addison Road during works.	No data available	700m	8min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
SCL/9/1 (public footpath)	Calvert	079+200	Construction of Footpath SCL/8, IMD Reception Sidings and the East West rail overbridge	Temporary diversion via SCL/8/2 and Addison Road during works.	No data available	1.8km	21min
TWY/4/1 (public footpath)	Calvert	080+200	Construction of East West rail overbridge	Temporary diversion along the west of the temporary stockpiles and crossing at Main Street to the eastern side of the railway line.	3	100m	1min
SCL/6/1 (public footpath)	Calvert	080+820	Construction of IMD Sidings	Temporary diversion to West Street and realigned Perry Hill.	0	1.5km	18min
West Street	Calvert	081+200	Construction of West Street Overbridge	Temporary diversion via footpath TWY/19/3 and TWY/18/2.	No data available	800m	10min
TWY/18/2 (public footpath)	Calvert	081+500	Flood compensation	Temporary diversion along existing track to join TWY/16/2	7	250m	3min
TWY/19/3 (public footpath)	Twyford	081+850	Flood compensation	Temporary diversion along existing track to join TWY/16/2	No data available	250m	3min
PBI/5A/3 (public footpath)	Twyford	083+100	Construction of PBI/5 Accommodation Overbridge	Temporary diversion to the east of existing alignment across PBI/5 accommodation overbridge during construction.	15	800m	10min
PBI/9/3 (public footpath)	Godington	84+000	Construction of Godington East Viaduct	Temporary diversion around the eastern boundary of the construction site.	22	50m	1min
CHW/225/5/10 (public footpath)	Godington	084+350	Flood compensation	Temporary diversion to the east	No data available	100m	1min
CHW/225/4/10 (public footpath)	Godington	084+375	Flood compensation	Temporary diversion to the east	No data available	250m	3 mins
CHW/24/2 (public footpath)	Godington	084+400	Construction of Godington West Viaduct	Temporary diversion to the west of the original alignment	12	300m	4min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
School End	Chetwode	086+450	Construction of School End Overbridge	Temporary diversion to CHW/11/1 during construction of the overbridge.	14	200m	2min
BHA/3/1 (public footpath)	Godington	087+200	Barton Hartshorn Embankment	Temporary diversion to 308/3/20 or east of existing around construction works stockpile.	No data available	200m	2min

Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) Proposed Scheme operation description

Operation trip assumptions

- 7.9.111 During operation of the Proposed Scheme, the IMD located at Calvert will result in a change in traffic flows on the A41 Main Street, West Street, Perry Hill, Portway Road, Buckingham Road/Gawcott Road and Country Lane within the study area. The trip generation methodology and assumptions used have been detailed within Section 1.2.
- 7.9.112 The impact of the IMD upon the local road network for 2026 and 2041 has been assessed and is detailed in the following section.
- 7.9.113 The proposed future East West Rail Link between East Anglia and Central, Southern and Western England is expected to be fully operational by 2019. In addition, East West Rail Link passenger services between Milton Keynes and Aylesbury are expected to commence operating on the upgraded Aylesbury Link from December 2017. Once operational, these new rail passenger services may change the existing pattern of public transport use and modal share within the study area.
- 7.9.114 It is forecast that there will be no further substantial changes in demand on existing transport infrastructure within the study area for 2026 and 2041.

Avoidance and mitigation measures

- 7.9.115 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in their current location, or very close to their current location resulting in no substantial diversions of traffic onto alternative routes;

- retaining PRoW crossing the Proposed Scheme, with localised substitutes kept to a minimum length where necessary;
- workplace Framework Travel Plans for the IMD near Steeple Claydon to minimise single occupancy car journeys and encourage use of sustainable modes of transport; and
- Servicing and delivery strategy for the IMD near Steeple Claydon, including movement of materials by rail where practicable to reduce deliveries by road.

7.9.116 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) operation impacts

- 7.9.117 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.
- 7.9.118 The impacts and consequential impacts of the operation of the Proposed Scheme in 2041 will be the same as for 2026, having taken account of increased background traffic growth.
- 7.9.119 The IMD at Calvert will generate traffic on the highway network within the study area during operation of the Proposed Scheme and has been accounted for within the 2026 and 2041 years of assessment.

Key operation transport issues

- 7.9.120 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.
- permanent change in traffic flows due to the Proposed Scheme IMD; and
 - permanent realignment or closure of PRoW and associated diversions to non-motorised users.
- 7.9.121 No substantial traffic and transport impacts are expected on waterways and canals, rail services, public transport interchanges, parking and loading, public transport, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.9.122 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.
- 7.9.123 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.

- 7.9.124 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows for all roads within the study area, apart from those affected by traffic generated by the IMD as discussed below, are expected to remain the same as the 2026 and 2041 future baseline traffic flows.
- 7.9.125 Traffic flow changes assigned to the local road network within the study area, where considered to be impacted by IMD traffic, are presented in Table 7-134, Table 7-135 and Table 7-136 for AM peak, PM peak and off-peak (21:00-22:00) hour flows for 2026 year of operation, respectively.
- 7.9.126 Assessment of the off-peak has been included as it is the time period where the highest number of IMD vehicles are forecast to arrive at and depart the IMD. It therefore represents a 'worst case' and most robust scenario upon the road network.

Table 7-134: Calvert, Steeple Claydon, Twyford and Chetwode strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – AM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	1083	1089	78	+6	0	1%	0%
	WB	858	858	72	0	0	0%	0%
Main Street (between School Hill and Portway Road)	NB	49	52	5	+3	0	6%	0%
	SB	39	39	1	0	0	0%	0%
Main Street (south of School Hill, Charndon)	NB	67	70	5	+3	0	4%	0%
	SB	79	79	2	0	0	0%	0%
West Street (between Perry Hill and Portway Road)	NB	77	83	1	+6	0	8%	0%
	SB	79	79	1	0	0	0%	0%
West Street between Perry Hill and Steeple Claydon)	NB	51	51	0	0	0	0%	0%
	SB	83	102	0	+19	0	23%	0%
Perry Hill (between School Hill and Edgcott)	NB	137	149	6	+12	0	9%	0%
	SB	209	209	4	0	0	0%	0%
Perry Hill (between School Hill and West Street)	NB	105	117	2	+12	0	11%	0%
	SB	115	115	5	0	0	0%	0%
Perry Hill (North of West Street)	NB	162	162	10	0	0	0%	0%
	SB	154	158	11	+4	0	3%	0%

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Portway Road (Twyford)	NB	87	90	4	+3	0	3%	0%
	SB	101	101	9	0	0	0%	0%
Buckingham Rd/Gawcott Rd (Gawcott)	NB	196	196	2	0	0	0%	0%
	SB	119	119	1	0	0	0%	0%
School End (Chetwode)	NB	24	24	3	0	0	0%	0%
	SB	19	19	3	0	0	0%	0%

Table 7-135: Calvert, Steeple Claydon, Twyford and Chetwode strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – PM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	919	919	31	0	0	0%	0%
	WB	906	912	26	+6	0	1%	0%
Main Street (between School Hill and Portway Road)	NB	66	66	6	0	0	0%	0%
	SB	64	67	4	+3	0	5%	0%
Main Street (south of School Hill, Charndon)	NB	110	110	5	0	0	0%	0%
	SB	75	78	3	+3	0	4%	0%
West Street (between Perry Hill and Portway Road)	NB	97	97	1	0	0	0%	0%
	SB	88	94	1	+6	0	7%	0%
West Street between Perry Hill and Steeple Claydon)	NB	98	117	0	+19	0	19%	0%
	SB	60	60	0	0	0	0%	0%

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Perry Hill (between School Hill and Edgcott)	NB	223	223	4	0	0	0%	0%
	SB	126	138	8	+12	0	9%	0%
Perry Hill (between School Hill and West Street)	NB	120	120	1	0	0	0%	0%
	SB	77	89	3	+12	0	16%	0%
Perry Hill (North of West Street)	NB	169	173	3	+4	0	2%	0%
	SB	143	143	10	0	0	0%	0%
Portway Road (Twyford)	NB	101	101	4	0	0	0%	0%
	SB	110	113	6	+3	0	3%	0%
Buckingham Rd/Gawcott Rd (Gawcott)	NB	118	118	0	0	0	0%	0%
	SB	152	152	0	0	0	0%	0%
School End (Chetwode)	NB	28	28	0	0	0	0%	0%
	SB	15	15	0	0	0	0%	0%

Table 7-136: Calvert, Steeple Claydon, Twyford and Chetwode strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – Off-peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	178	192	0	+14	0	8%	0%
	WB	223	226	0	+3	0	1%	0%
Main Street (between School Hill and Portway Road)	NB	15	22	0	+7	0	48%	0%
	SB	13	15	0	+2	0	15%	0%
Main Street (south of School Hill, Charndon)	NB	23	30	0	+7	0	31%	0%
	SB	19	21	0	+2	0	10%	0%
West Street (between Perry Hill and Portway Road)	NB	19	33	0	+14	0	73%	0%
	SB	24	28	0	+4	0	17%	0%
West Street between Perry Hill and Steeple Claydon)	NB	17	28	0	+11	0	66%	0%
	SB	14	59	0	+45	0	321%	0%
Perry Hill (between School Hill and Edgcott)	NB	29	57	0	+28	0	96%	0%
	SB	27	34	0	+7	0	26%	0%
Perry Hill (between School Hill and West Street)	NB	17	45	0	+28	0	169%	0%
	SB	17	24	0	+7	0	41%	0%
Perry Hill (North of West Street)	NB	27	29	0	+2	0	7%	0%
	SB	24	33	0	+9	0	38%	0%
Portway Road (Twyford)	NB	24	31	0	+7	0	29%	0%
	SB	27	29	0	+2	0	7%	0%
Buckingham Rd/Gawcott Rd	NB	39	40	0	+1	0	3%	0%

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
(Gawcott)	SB	53	58	0	+5	0	9%	0%
School End (Chetwode)	NB	1	2	0	+1	0	79%	0%
	SB	4	9	0	+5	0	112%	0%

- 7.9.127 During the AM and PM peak, there is only up to a 1% increase in traffic flow (up to six additional vehicles) on the A41 as a result of IMD traffic, which is insufficient to give rise to substantial impacts upon motorised and non-motorised users. During the off-peak hour, there is up to 8% increase in traffic (up to 14 additional vehicles) as a result of IMD traffic. However baseline flows are much lower than in the AM and PM peaks and well under the theoretical capacity of the link. Therefore the increase in traffic during the off-peak on A41 will also be insufficient to give rise to substantial impacts upon motorised or non-motorised users.
- 7.9.128 During the AM and PM peak, there is up to 23% increase in traffic flow on West Street (between Perry Hill and Steeple Claydon), which is the main access and egress to the IMD. However, this represents an increase of only 19 vehicles during peak hour and the road would remain well under the theoretical capacity of the link. On all other roads that will be used by IMD traffic, there is up to 16% increase in traffic flows, the equivalent of an additional 12 vehicles. The negligible increase in traffic due to operation of the IMD during peak periods will be insufficient to be give rise to substantial impacts upon motorised or non-motorised users.
- 7.9.129 During the off-peak, there is up to 321% increase in traffic flow on local roads impacted by the IMD, which equates to an additional 45 vehicles. However, future baseline flows on all affected roads are low (up to 53 vehicles an hour), and therefore the IMD traffic will be insufficient to be give rise to substantial impacts upon motorised or non-motorised users.
- 7.9.130 Traffic flow changes assigned to the local road network within the study area, where considered to be impacted by IMD traffic, are presented in Table 153, Table 7-138 and Table 7-139 for AM peak, PM peak and off-peak (21:00-22:00) hour flows for 2041 year of operation, respectively.

Table 7-137: Calvert, Steeple Claydon, Twyford and Chetwode strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – AM peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	1261	1267	91	+6	0	0%	0%
	WB	998	998	84	0	0	0%	0%
Main Street (between School Hill and Portway Road)	NB	60	63	6	+3	0	5%	0%
	SB	48	48	2	0	0	0%	0%
Main Street (south of School Hill, Charndon)	NB	83	86	6	+3	0	4%	0%
	SB	97	97	3	0	0	0%	0%
West Street (between Perry Hill and Portway Road)	NB	95	101	1	+6	0	6%	0%
	SB	97	97	2	0	0	0%	0%
West Street between Perry Hill and Steeple Claydon)	NB	63	63	1	0	0	0%	0%
	SB	102	121	1	+19	0	19%	0%
Perry Hill (between School Hill and Edgcott)	NB	169	181	9	+12	0	7%	0%
	SB	257	257	6	0	0	0%	0%
Perry Hill (between School Hill and West Street)	NB	129	141	2	+12	0	9%	0%
	SB	141	141	6	0	0	0%	0%
Perry Hill (North of West Street)	NB	200	200	12	0	0	0%	0%
	SB	189	193	14	+4	0	2%	0%
Portway Road (Twyford)	NB	108	111	5	+3	0	3%	0%

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
	SB	125	125	11	0	0	0%	0%
Buckingham Rd/Gawcott Rd (Gawcott)	NB	236	236	2	0	0	0%	0%
	SB	143	143	1	0	0	0%	0%
School End (Chetwode)	NB	29	29	4	0	0	0%	0%
	SB	23	23	3	0	0	0%	0%

Table 7-138: Calvert, Steeple Claydon, Twyford and Chetwode strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – PM peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	1084	1084	37	0	0	0%	0%
	WB	1068	1074	31	+6	0	1%	0%
Main Street (between School Hill and Portway Road)	NB	82	82	8	0	0	0%	0%
	SB	81	84	5	+3	0	4%	0%
Main Street (south of School Hill, Charndon)	NB	138	138	6	0	0	0%	0%
	SB	93	96	3	+3	0	3%	0%
West Street (between Perry Hill and Portway Road)	NB	122	122	1	0	0	0%	0%
	SB	110	116	1	+6	0	5%	0%
West Street between Perry Hill and Steeple Claydon)	NB	123	142	0	+19	0	15%	0%
	SB	75	75	0	0	0	0%	0%
Perry Hill (between School Hill	NB	279	279	5	0	0	0%	0%

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		158	170	9	+12	0	8%	0%
and Edgcott)	NB	151	151	1	0	0	0%	0%
	SB	96	108	4	+12	0	13%	0%
Perry Hill (North of West Street)	NB	212	216	3	+4	0	2%	0%
	SB	179	179	13	0	0	0%	0%
Portway Road (Twyford)	NB	127	127	5	0	0	0%	0%
	SB	138	141	8	3	0	2%	0%
Buckingham Rd/Gawcott Rd (Gawcott)	NB	144	144	0	0	0	0%	0%
	SB	186	186	0	0	0	0%	0%
School End (Chetwode)	NB	35	35	3	0	0	0%	0%
	SB	18	18	2	0	0	0%	0%

Table 7-139: Calvert, Steeple Claydon, Twyford and Chetwode strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – Off-peak

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		224	238	0	+14	0	6%	0%
A41 Aylesbury Road between The Broadway (Grendon Underwood) and A4421 (Bicester)	EB	280	283	0	+3	0	1%	0%
	WB	18	25	0	7	0	38%	0%
Main Street (between School Hill	NB							

Location	Direction	2041 baseline flow	2041 With HS2 traffic		With HS2 actual change from 2041 baseline		With HS2 % change from 2041 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
and Portway Road)	SB	16	18	0	2	0	12%	0%
	NB	28	35	0	7	0	25%	0%
Main Street (south of School Hill, Charndon)	SB	25	27	0	2	0	8%	0%
	NB	24	38	0	14	0	58%	0%
West Street (between Perry Hill and Portway Road)	SB	30	34	0	4	0	13%	0%
	NB	21	32	0	11	0	53%	0%
West Street between Perry Hill and Steeple Claydon)	SB	18	63	0	45	0	255%	0%
	NB	37	65	0	+28	0	77%	0%
Perry Hill (between School Hill and Edgcott)	SB	34	41	0	+7	0	20%	0%
	NB	21	49	0	+28	0	134%	0%
Perry Hill (between School Hill and West Street)	SB	22	29	0	+7	0	32%	0%
	NB	34	36	0	+2	0	6%	0%
Perry Hill (North of West Street)	SB	30	39	0	+9	0	30%	0%
	NB	30	37	0	+7	0	23%	0%
Portway Road (Twyford)	SB	34	36	0	+2	0	6%	0%
	NB	49	50	0	+1	0	2%	0%
Buckingham Rd/Gawcott Rd (Gawcott)	SB	67	72	0	+5	0	8%	0%
	NB	2	3	0	+1	0	62%	0%
School End (Chetwode)	SB	6	11	0	+5	0	89%	0%

- 7.9.131 The increase in traffic flow on roads affected by the IMD is the same during the 2041 year of assessment as reported for the 2026 year of assessment. However, as baseline traffic flows for 2041 are higher than those for 2026, the impact of the IMD traffic will be slightly less in 2041 compared to 2026. As with the 2026 year of assessment, the number of trips generated by workers commuting to and from the IMD will be insufficient to give rise to substantial impacts upon motorised or non-motorised users.

Junction performance

- 7.9.132 During operation of the Proposed Scheme, junctions have been subject to assessment where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour or off-peak hour two-way traffic flow of 2% or more due to the Proposed Scheme, on any arm of the junction. For operation of the Proposed Scheme, the assessment has been carried out for assessment year 2041, as it represents the worst case scenario whereby the baseline flows are higher than in assessment year 2026., and is therefore more robust.
- 7.9.133 All roads subject to an increase in traffic flow as a result of the IMD have low (less than 500 vehicles) peak or off-peak hour two-way traffic flows and, consequently, do not meet the junction assessment criteria set out above. Therefore, all junctions on these roads are considered to operate well within capacity during operation of the Proposed Scheme and have not been subject to assessment.

Pedestrians, cyclists and equestrians

- 7.9.134 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.
- 7.9.135 The review of PRoW links indicates that there will be additional walking distances on 17 routes due to permanent realignments, with six of these realigned links requiring a diversion of more than 500m.
- 7.9.136 Table 7-140 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.9.137 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-054 to CT-06-058-L1 (Volume 2, Map Book 13).

Table 7-140: Calvert, Steeple Claydon, Twyford and Chetwode summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
SCL13/2 (public footpath)	Calvert	077+450	Permanently realignment to the south of existing.	1	70m	1 min
Addison Road	Calvert	079+600	Permanently diversion to offline realigned road.	No data available	100m	1 min
SCL7/1 (public footpath)	Calvert	079+200	Permanently diversion to cross East West Railway via Footpath SCL/8 overbridge.	No data available	1km	12 min
SCL7/2 (public footpath)	Calvert	079+200	Permanently diversion to cross East West Railway via Footpath SCL/8 overbridge.	No data available	1km	12 min
SCL9/1 (public footpath)	Calvert	079+200	Permanently diversion to cross East West Railway via footbridge with SCL/8. Footpath SCL/9 diverted to cross EWR via common Footbridge.	No data available	1km	12 min
TWY/4/1 (public footpath)	Calvert	080+200	Permanently diversion along the western side of the East West Railway line and crossing at Main Street to the eastern side of the railway line.	3	50m	1 min
SCL/6/1 (public footpath)	Calvert	080+820	Permanently diversion along the new landscaping and earthworks to the north of Calvert IMD. To connect to TWY/4/1, footpath SCL/6/1 will be routed via the realigned Perry Hill and along the top of Perry Hill underbridge cutting (between link road and TWY/4/1 section) and follows maintenance access then rejoins.	0	1.2km	14 min
TWY/18/2 (public footpath)	Calvert	081+500	Permanently diversion via West Street and existing track (dismantled railway).	7	650m	8 min
TWY/16/1 (public footpath)	Calvert	081+500	Permanently diversion under Twyford Viaduct.	15	500m	6 min
TWY/17/1 (public footpath)	Twyford	082+000	Permanently diversion under Twyford Viaduct.	3	800m	10 min
PBI/6/3 (public footpath)	Twyford	082+700	Permanently diversion across Footpath PBI/5 accommodation	No data available	100m	1 min

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
			overbridge.			
PBI/6/2 (public footpath)	Twyford	082+700	Permanently diversion across Footpath PBI/5 accommodation overbridge.	0	100m	1 min
Godington viaduct Footpath PBI/9/3 (public footpath)	Godington	84+000	Permanently diversion under Godington East Viaduct.	22	300m	4 min
CHW/18/1 (public footpath)	Chetwold	085+700	Permanently diversion to The Green overbridge.	23	200m	2 min
CHW/11/1 (public footpath)	Chetwold	086+300	Permanently diversion to School End overbridge.	15	150m	2 min
308/3a/10 (public footpath)	Chetwold	087+200	Permanently diversion diverted across footpath BHA/2 overbridge.	No data available	200m	2 min
BHA/2/2 (public footpath)	Chetwold	087+300	Permanent diversion via Footpath BHA/2 overbridge.	0	300m	4 min

7.9.138 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

7.10 Newton Purcell to Brackley (CFA14)

Newton Purcell to Brackley (CFA14) Proposed Scheme description

- 7.10.2 The Proposed Scheme through this area will be approximately 12km in length. It will commence from south-east of Newton Purcell in a cutting. It will then proceed north-west, passing just east of Newton Purcell. After passing just to the east of Mixbury, the Proposed Scheme will cross the River Great Ouse on a viaduct to the west of Westbury.
- 7.10.3 The Proposed Scheme will continue north-west through a cutting passing just to the east of Turweston before re-crossing the River Great Ouse on a viaduct. It will continue north-west, predominantly in cutting, crossing the A43 Oxford Road to the east of Brackley before crossing the Helmdon Disused Railway SSSI to the south of Radstone. The Proposed Scheme will leave this area south-west of Halse Copse South, near Radstone.
- 7.10.4 The area is predominantly rural land, with mixed agriculture being the main land use. Development is typically small villages and isolated farmsteads. The villages of Newton Purcell, Westbury, Turweston, Whitfield and Radstone lie within the area, whilst the largest settlement is the town of Brackley, located 900m to the west of the Proposed Scheme.
- 7.10.5 The Newton Purcell to Brackley study area includes the A43 Oxford Road, the A4421 Buckingham Road (Newton Purcell), the A421 London Road, the A422 Brackley Road, the B4525 Welsh Lane and local roads that are affected by the Proposed Scheme. The Proposed Scheme crosses six roads within the study area.
- 7.10.6 The Proposed Scheme will not cross any existing railway lines; however it will be partly on, and adjacent to, the former GCM railway for a section in the south. It will also cross the disused Banbury to Verney Junction Branch Line railway, which runs from east to west across the area.
- 7.10.7 PRoW within the area include the Westbury Circular Ride, which the Proposed Scheme crosses via Westbury viaduct, the Palladian Way and the Seven Shires Way. The Proposed Scheme crosses PRoW in 15 locations. In addition to the 15 PRoW, the Proposed Scheme crosses six roads with the potential for use by non-motorised users.
- 7.10.8 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.10.9 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2 (CFA Report 21)

- 7.10.10 The route of the Proposed Scheme will leave the Calvert, Steeple Claydon, Twyford and Chetwode area (CFA13) within the Barton to Mixbury cutting which is. This section of the Proposed Scheme extends from just south-east of Newton Purcell to the east of Mixbury. Key permanent features of this section will include replacement access for Widmore Farm to the west of the Proposed Scheme, which will run parallel to the Proposed Scheme from the A421 London Road
- 7.10.11 The route will continue into the Mixbury embankment and cutting section and a cutting.
- 7.10.12 The route will continue into the Westbury viaduct and embankments section. Key permanent features of this section will include a viaduct to carry the Proposed Scheme over the River Great Ouse west of Westbury and the realignment of Bridleway 303/5 under the viaduct.
- 7.10.13 The route will continue into the Turweston cutting. This section of the Proposed Scheme extends from north of the River Great Ouse near Westbury to south of the River Great Ouse near Turweston.
- 7.10.14 The route will continue into the Turweston viaduct and adjacent earthworks and Brackley south cutting section which extends from south of the River Great Ouse near Turweston to north of Footpath AX15.
- 7.10.15 The A43 Oxford Road is a dual carriageway trunk road which crosses the Proposed Scheme to the east of Brackley. It will be realigned over a length of approximately 2km to the north of its current alignment. The realignment will commence at the western tie-in with the existing roundabout with Northampton Road. It will cross over the Proposed Scheme on an overbridge and rejoin the current alignment of the A43 to the south-west of The Avenue. Key permanent features of this section will include downgrading of the existing A43 Oxford Road to a single lane and a junction with Radstone Road on the western side of the Proposed Scheme.
- 7.10.16 The Proposed Scheme will continue into the Brackley north cutting section which comprises an embankment and a cutting. The section extends from north of Footpath AX15 overbridge to south of Halse Copse South. K
- 7.10.17 The Proposed Scheme will then continue northward into the Greatworth to Lower Boddington area (CFA15).

Newton Purcell to Brackley (CFA14) assessment methodology

- 7.10.18 The assessment methodology used is described in Section 5 and Section 7.2 of this Transport Assessment report. Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The factors have been derived for the individual road types and relevant wards. The assessment covers the morning (08:00-09:00) and evening (17:00-18:00) peak periods for an average weekday.

- 7.10.19 Within the study area baseline traffic volumes have been amended to take specific account of the consented changes to the developments at Radstone Fields, Brackley; Sawmills Site, Northampton Road; Lane North of Turweston, Brackley; and Silverstone.
- 7.10.20 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading). As a consequence, local transport impacts may be over-estimated.
- 7.10.21 The link capacities of roads within the study area have been analysed to identify any that are likely to experience traffic congestion in the future baseline, without the Proposed Scheme. Operation of the Proposed Scheme will not result in any additional traffic on roads within this study area. Therefore, link capacities have only been assessed for those roads affected by the Proposed Scheme during construction.
- 7.10.22 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021 baseline have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Newton Purcell to Brackley (CFA14) future baseline

Key future baseline issues

- 7.10.23 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 11%-16%;
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 19%-27%; and
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 36%-56%.
- 7.10.24 As a result of this analysis, no roads subject to assessment within the study area are expected to experience substantial traffic congestion and delay in the 2021 future baseline situation, without Proposed Scheme traffic.
- 7.10.25 There are no other key future baseline issues identified within the study area.

Land use assumptions

- 7.10.26 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional localised traffic growth not accounted for by the growth factors previously described.
- 7.10.27 The following planned developments have been identified in the study area which will have a direct localised impact on future baseline traffic flows on the A43 that would not be fully reflected by applying TEMPRO growth factors alone:
- Radstone Fields, Brackley (a 1,000 unit residential development including a local centre with community hall, a site for a new primary school and open space);
 - Sawmills Site, Northampton Road (a 130 unit residential development);
 - Lane North of Turweston, Brackley (an industrial/business park development);
 - Lane South of Turweston, Brackley (a 350 unit residential development); and
 - Silverstone (a mixed use development, comprising offices, workshops, education campus, three hotels, spectator facilities including welcome centre and museum, leisure and events spaces, and reconfiguration of existing and provision of new grandstands. The development includes revised parking and loading and access arrangements, including a new access off the A43 and/or improvements to the existing A43/Dartford Road junction).
- 7.10.28 Consequently, TEMPRO factors have been adjusted to take specific account of these developments to derive future baseline traffic flows on the A43.
- 7.10.29 The TEMPRO growth factors used in the study area are shown in Table 7-141.

Table 7-141: Newton Purcell to Brackley summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	11%	19%	36%
Maximum	16%	27%	56%
Average	14%	23%	46%

Transport growth assumptions

- 7.10.30 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.

- 7.10.31 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.

Strategic and local road network traffic flows

- 7.10.32 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are the A43 Oxford Road, A4421, Buckingham Road, A421 London Road, A422 Brackley Road, B4525 Welsh Lane, Manor Farm Road, Featherbed Lane (also known as Fulwell Lane), Fulwell Road, Valley Road (Finmere), Mere Road, Sandpit Hill, Northampton Road, Turweston Road, Turweston Green, South Bank and Radstone Road.
- 7.10.33 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B(iii) .
- 7.10.34 The percentage change listed has been calculated from average observed traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.10.35 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area , are presented in Table 7-142 and Table 7-143 for AM peak and PM peak flows respectively.
- 7.10.36 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-144 and Table 7-145 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.10.37 One accident cluster of nine or more accidents in a three year period has been identified on the road network subject to assessment in the study area through interrogation of accident data. The location of this cluster is at the junction of the M40 with the A43 Oxford Road, where 10 accidents were recorded between 2007 and 2009.

Table 7-142: Newton Purcell to Brackley strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A422 Brackley Road (Westbury)	EB	371	9	492	10	529	11	638	13	121	158	109	32%	43%	72%
	WB	357	6	444	7	480	8	584	10	87	123	104	24%	34%	64%
A4421 Buckingham Road (south of Barton Hartshorn, Newton Purcell)	NB	465	10	515	11	552	12	642	14	50	87	90	11%	19%	38%
	SB	551	11	611	12	655	13	762	15	60	104	107	11%	19%	38%
A4421 Buckingham Road (north of Barton Hartshorn)	NB	447	25	496	28	531	30	618	35	49	84	87	11%	19%	38%
	SB	553	28	613	31	657	33	765	39	60	104	108	11%	19%	38%
A421 (London Road, Mixbury)	EB	473	22	524	24	562	26	654	30	51	89	92	11%	19%	38%
	WB	410	24	454	27	487	29	566	33	44	77	79	11%	19%	38%
A43 Oxford Road (south of Northampton Road, Brackley)	NB	931	111	1173	126	1396	135	1514	158	242	465	118	26%	50%	63%
	SB	1537	158	1737	179	1764	192	1775	225	200	227	11	13%	15%	15%
A43 Oxford Road (north of Northampton Road, Brackley)	NB	1212	63	1480	71	1703	76	1821	89	268	491	118	22%	41%	50%
	SB	1539	82	1672	93	1698	100	1710	117	133	159	12	9%	10%	11%
A43 (Brackley to M40)	NB	1097	149	1264	171	1487	184	1605	217	167	390	118	15%	36%	46%
	SB	1132	137	1343	157	1370	169	1381	200	211	238	11	19%	21%	22%
A43 (between A421)	NB	1132	137	1299	157	1522	169	1640	200	167	390	118	15%	34%	45%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
and A422, Brackley)	SB	1508	175	1719	201	1746	216	1757	255	211	238	11	14%	16%	17%
A43 (between A422W and A422E, Brackley)	NB	1216	143	1420	162	1643	174	1761	203	204	427	118	17%	35%	45%
	SB	1433	181	1588	205	1615	220	1626	257	155	182	11	11%	13%	13%
A43 (SW of Silverstone)	NB	1106	150	1353	172	1646	185	1801	219	247	540	155	22%	49%	63%
	SB	1650	216	1747	247	1781	266	1797	314	97	131	16	6%	8%	9%
B4525 Welsh Lane (Helmdon)	EB	234	9	268	11	289	12	348	14	34	55	59	15%	24%	49%
	WB	217	7	249	8	268	9	322	11	32	51	54	15%	24%	49%

Table 7-143: Newton Purcell to Brackley strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A422 Brackley Road (Westbury)	EB	315	2	434	3	469	3	570	4	119	154	255	38%	49%	81%
	WB	336	3	469	4	505	4	613	5	133	169	277	40%	50%	82%
A4421 Buckingham Road (south of Barton Hartshorn, Newton Purcell)	NB	676	13	752	14	809	16	955	18	76	133	279	11%	20%	41%
	SB	490	5	546	6	587	6	692	7	56	97	202	11%	20%	41%
A4421 Buckingham Road (north of Barton Hartshorn)	NB	668	27	744	30	800	32	944	38	76	132	276	11%	20%	41%
	SB	485	16	540	18	581	19	685	23	55	96	200	11%	20%	41%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A421 (London Road, Mixbury)	EB	405	15	451	17	485	18	572	21	46	80	167	11%	20%	41%
	WB	476	16	530	18	570	19	673	23	54	94	197	11%	20%	41%
A43 Oxford Road (south of Northampton Road, Brackley)	NB	1375	134	1591	153	1621	165	1635	195	216	246	260	16%	18%	19%
	SB	978	83	1250	95	1445	102	1552	121	272	467	574	28%	48%	59%
A43 Oxford Road (north of Northampton Road, Brackley)	NB	1504	76	1673	87	1703	93	1717	111	169	199	213	11%	13%	14%
	SB	1292	61	1536	69	1731	74	1838	88	244	439	546	19%	34%	42%
A43 (Brackley to M40)	NB	1497	145	1711	167	1741	181	1755	217	214	244	258	14%	16%	17%
	SB	1672	140	1898	161	2093	175	2200	209	226	421	528	14%	25%	32%
A43 (between A421 and A422, Brackley)	NB	1672	140	1886	161	1916	175	1930	209	214	244	258	13%	15%	15%
	SB	1217	101	1443	116	1638	126	1745	151	226	421	528	19%	35%	43%
A43 (between A422W and A422E, Brackley)	NB	1506	140	1674	160	1704	172	1718	204	168	198	212	11%	13%	14%
	SB	1333	106	1556	121	1751	130	1858	154	223	418	525	17%	31%	39%
A43 (SW of Silverstone)	NB	1510	146	1632	169	1671	182	1689	219	122	161	179	8%	11%	12%
	SB	1458	120	1678	138	1934	150	2074	180	220	476	616	15%	33%	42%
B4525 Welsh Lane (Helmdon)	EB	220	4	254	4	275	5	337	6	34	55	117	15%	25%	53%
	WB	190	4	219	4	237	5	290	6	29	47	100	15%	25%	53%

Table 7-144: Newton Purcell to Brackley local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Manor Farm Lane (Newton Purcell)	EB	22	0	24	0	26	0	30	0	2	4	8	11%	19%	38%
	WB	15	0	17	0	18	0	21	0	2	3	6	11%	19%	38%
Turweston Farm Track/ Oatleys Road (Turweston)	EB	5	0	6	0	6	0	8	0	1	1	3	15%	25%	54%
	WB	8	0	9	0	9	0	12	0	1	1	4	15%	25%	54%
Featherbed Lane (Mixbury)	NB	24	1	26	0	28	0	32	0	2	4	8	11%	19%	38%
	SB	20	0	22	0	24	0	28	0	2	4	8	11%	19%	38%
Northampton Road (Brackley)	NB	377	9	723	10	723	11	723	13	346	346	346	92%	92%	92%
	SB	263	4	531	5	531	5	531	6	268	268	268	102%	102%	102%
Radstone Road (Radstone)	NB	74	0	84	0	90	0	107	0	10	16	33	14%	22%	45%
	SB	119	1	134	1	144	1	172	1	15	25	53	14%	22%	45%
Fulwell Rd (Finmere)	EB	18	3	19	3	21	3	24	3	1	3	6	11%	19%	38%
	WB	28	0	31	0	33	0	38	0	3	5	10	11%	19%	38%
Turweston Road/South Bank (Turweston)	NB	19	0	21	0	23	0	28	0	2	4	9	15%	24%	49%
	SB	31	0	35	0	38	0	46	0	4	7	15	15%	24%	49%

Table 7-145: Newton Purcell to Brackley local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021		2026		2041	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Manor Farm Lane (Newton Purcell)	EB	22	0	25	0	26	0	31	0	3	4	9	12%	20%	41%
	WB	14	0	15	0	16	0	19	0	1	2	5	12%	20%	41%
Turweston Farm Track/Oatleys Road (Turweston)	EB	5	0	5	0	6	0	7	0	0	1	2	16%	26%	58%
	WB	6	0	7	0	8	0	10	0	1	2	4	16%	26%	58%
Featherbed Lane (Mibury)	NB	16	0	18	0	19	0	23	0	2	3	7	12%	20%	41%
	SB	14	0	16	0	17	0	20	0	2	3	6	12%	20%	41%
Northampton Road (Brackley)	NB	264	3	602	3	602	4	602	4	338	338	338	128%	128%	128%
	SB	352	2	710	2	710	2	710	3	358	358	358	102%	102%	102%
Radstone Road (Radstone)	NB	95	1	108	1	116	1	141	1	13	21	46	14%	23%	49%
	SB	61	0	70	0	75	0	91	0	9	14	30	14%	23%	49%
Fulwell Rd (Finmere)	EB	15	1	16	1	17	1	20	1	1	2	5	12%	20%	41%
	WB	19	0	21	0	22	0	26	0	2	3	7	12%	20%	41%
Turweston Road/South Bank (Turweston)	NB	29	0	33	0	36	0	44	0	4	7	15	15%	25%	53%
	SB	15	0	18	0	19	0	24	0	3	4	9	15%	25%	53%

Newton Purcell to Brackley (CFA14) Proposed Scheme construction description

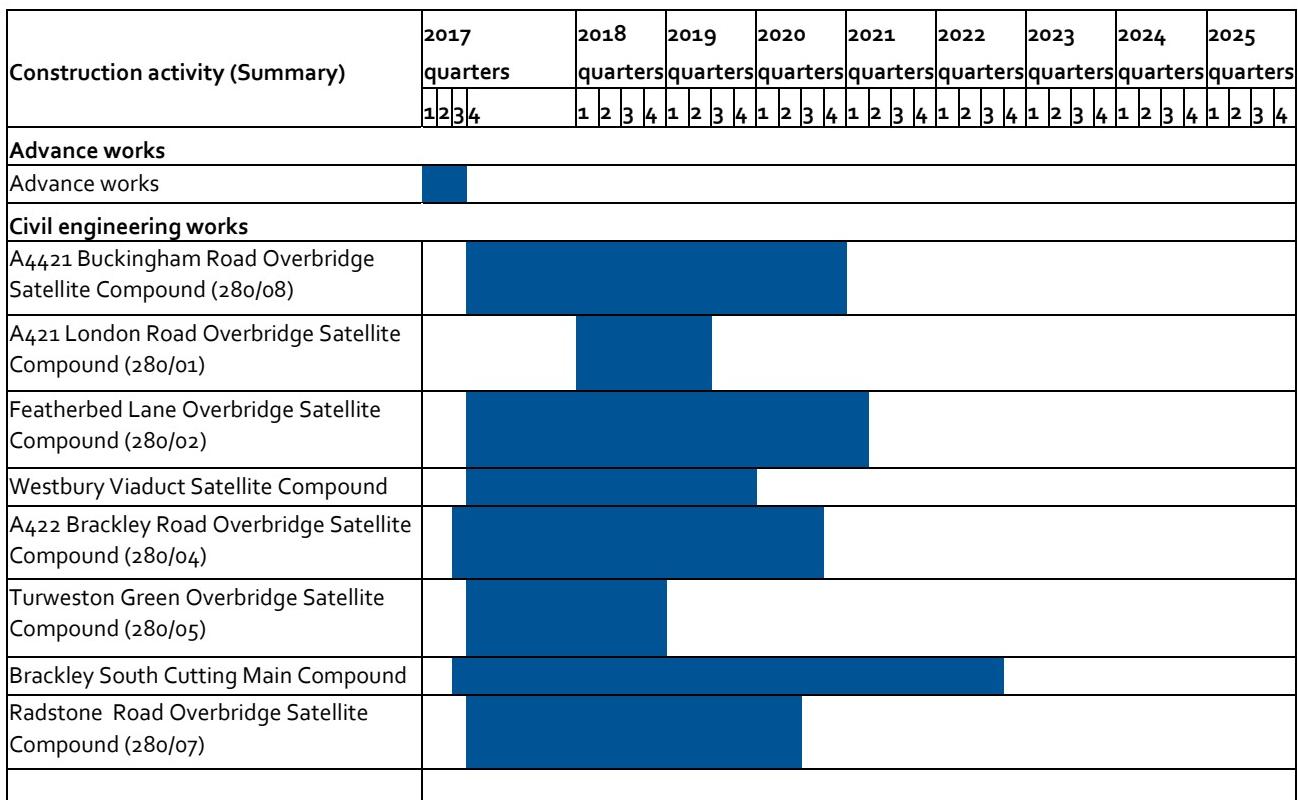
Construction activities

7.10.38 The major construction elements within the study area are as follows:

- Barton to Mixbury cutting;
- Mixbury embankment and cutting;
- Westbury viaduct and embankments;
- Turweston cutting;
- Turweston viaduct, adjacent earthworks and Brackley south cutting;
- A43 Oxford Road realignment and overbridge; and
- Brackley north cutting.

7.10.39 Details of the construction phasing are provided in Volume 2, Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-14.

Figure 7-14: Newton Purcell to Brackley construction activity phasing



Construction activity (Summary)	2017	2018	2019	2020	2021	2022	2023	2024	2025
	quarters								
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Rail infrastructure and systems works									
High speed railway installation (From Calvert Railhead main compound)						1	2	3	4
Tibbets Farm EFATS satellite compound						1	2	3	4
Whitfield ATS satellite compound						1	2	3	4
Commissioning									
Commissioning (until end 2026)						1	2	3	4

Compounds and construction sites

- 7.10.40 Main site compounds would be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds would generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.10.41 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-146. There are no compounds within the study area with shift working (24 hours).
- 7.10.42 The location of compounds are shown on Maps CT-05-06ob to CT-05-068a (Volume 2, Map Book 14).

Table 7-146: Newton Purcell to Brackley assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Satellite	A4421 Buckingham Road overbridge	40	97
Satellite	A421 London Road overbridge	52	90
Satellite	Featherbed Lane overbridge	24	86
Satellite	Tibbets Farm express feeder auto-transformer station	26	38
Satellite	Westbury viaduct	89	122

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Satellite	A422 Brackley Road overbridge	34	86
Satellite	Turweston Green overbridge	36	45
Main	Brackley south cutting	106	230
Satellite	Whitfield auto-transformer station	26	38
Satellite	Radstone Road overbridge	40	90

Construction trip assumptions

Trip generation

- 7.10.43 The duration of when there will be busy transport activity at each site is shown in Table 7-147. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-147: Newton Purcell to Brackley typical vehicle trip generation for construction site compounds

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	A4421 Buckingham Road overbridge	A4421 Buckingham Road, A421 London Road	2017	Three years	11 months	120-140	<10
Satellite	A421 London Road overbridge	A421 London Road	2018	One year and six months	Seven months	110-130	10-20
Satellite	Featherbed Lane overbridge						

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
Satellite	Tibbetts Farm express feeder auto-transformer station	Featherbed Lane via A421 London Road, A43	2017	Five years and three months	14 months	90-130	10-40
Satellite	Westbury viaduct	Haul road via A442 Brackley Road, A43	2017	Two years	19 months	100-120	10-20
Satellite	A422 Brackley Road overbridge	A422 Brackley Road, A43	2017	Three years	17 months	30-50	850-1,430
Satellite	Turweston Green overbridge	Oatley's road/private access from A43	2017	One year	11 months	50-60	<10
Main	Brackley south cutting	A43	2017	Five years and nine months	32 months	200-270	20-40
Satellite	Whitfield auto-transformer station						
Satellite	Radstone Road overbridge	Radstone Road via B4525, A43	2017	Two years and six months	One year	230-290	10-20

7.10.44 Information on the indicative construction programme is provided in Figure 7-14 which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 7-147. Consequently the peak traffic movements presented will not generally occur at the same time, although in some instances there may be some overlap.

7.10.45 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment

7.10.46 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;
- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network; and
- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

- 7.10.47 Within the study area, mass-haul movements have been assigned to A421 (between boundary with CFA13 and the A43), A43 (between M40 and A422 Brackley Road) and A422 Brackley Road (between A43 and Proposed Scheme).
- 7.10.48 Within the study area, construction traffic has been assigned to the roads listed in the construction lorry routes section below. Workforce traffic has been assigned to the same roads and additionally Turweston Farm Track/Oatleys Road, Fulwell Road and Turweston Road/South Bank.
- 7.10.49 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.
- 7.10.50 From the CFA to the north, namely the Greatworth and Lower Boddington area, the cumulative construction traffic flows of approximately 110 cars/LGVs per day (two-way) and 50 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to B4525 Welsh Lane.
- 7.10.51 From the south, including the Calvert, Steeple Claydon, Twyford and Chetwode study area, the cumulative construction traffic flows of approximately 35 cars/LGVs per day (two-way) and 10 HGVs per day (two-way) have been included in the assessment for this area. These flows have been assigned to A421 and Manor Farm Lane.

Construction lorry routes

- 7.10.52 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Maps TR-03-058 to TR-03-059 (Volume 5, Map Book 71):
- A4421 Buckingham Road overbridge satellite compound will be accessed via Buckingham Road and A421 London Road;
 - A421 London Road overbridge satellite compound will be accessed via A421 London Road;
 - Featherbed Lane overbridge and Tibbetts Farm express feeder auto-transformer station satellite compounds will be accessed via Featherbed Lane from A421 London Road and A43 Oxford Road;
 - Westbury viaduct satellite compound will be accessed via haul road from A442 Brackley Road and A43 Oxford Road;
 - A422 Brackley Road overbridge satellite compound will be accessed via A422 Brackley Road and A43 Oxford Road;
 - Turweston Green overbridge satellite compound will be accessed via Oatley's road/private access and A43 Oxford Road;
 - Brackley South Cutting main compound and Whitfield auto-transformer station satellite compound will be accessed via A43 Oxford Road; and
 - Radstone Road overbridge satellite compound will be accessed via Radstone Road from B4525 Welsh Lane and A43 Oxford Road.

Traffic management, road closures and diversions

- 7.10.53 The roads in the study area that will be subject to temporary closure during construction of the Proposed Scheme are summarised in Table 7-148.
- 7.10.54 The approximate length of diversions listed is the 'worst case' scenario based on the maximum distance from one side of the road closure to the other. In reality, a proportion of vehicles diverted will be subject to a diversion distance less than what is reported.

Table 7-148: Newton Purcell to Brackley temporary road closures and diversions

Name	Location	Location (chainage)	Diversion route	Approximate length of diversions	Programme	Duration
Featherbed Lane	Mixbury	090+850	Fulwell Road, Valley Road, Mere Road, Sandpit Hill and A421 London RoadA421 London Road and Fulwell Road	7.6km	Nov 2018	Up to one year

- 7.10.55 The temporary diversion on Featherbed Lane will affect approximately 310 vehicles a day.
- 7.10.56 The A43 Oxford Road, A4421 Buckingham Road, A421 London Road, A422 Brackley Road and Radstone Road are to be realigned; however construction of the new roads will be carried out 'off-line', meaning that the existing roads will remain open with no diversion of traffic required until the new off-line sections of road are complete. Traffic management and/or very short term closures i.e. overnight, off-peak or weekend, may be required to tie the new off-line sections of road into existing roads immediately before switchover, although these are not considered to have a substantial impact upon motorised users.

PRoW closures and diversions

- 7.10.57 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-149.
- 7.10.58 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.
- 7.10.59 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-06ob to CT-05-068a (Volume 2, Map Book 14).

Table 7-149: Newton Purcell to Brackley temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
308/2/10 (public footpath)	Newton Purcell	087+500	Nov 2019	700m Up to one year	Barton Hartshorn Embankment Temporary diversion along south of construction works stockpile.
308/3/20 (public footpath)	Newton Purcell	087+500	Nov 2019	700m Up to one year	Barton Hartshorn Embankment Temporary diversion along south of construction works stockpile.

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
213/7/20 (public bridleway)	Newton Purcell	088+700	June 2018	100m Up to one year	Construction of Bridleway 213/7 Overbridge Temporary diversion on the eastern side of construction works for overbridge structure with potential for temporary closure or slight diversion during construction of tie-in.
A421 London Road	Mixbury	089+875	Feb 2018	100m Up to one year and six months	Construction of A421 London Road Overbridge Temporary diversion to the temporary road diversion.
303/7/10 (public footpath)	Mixbury	090+650	Aug 2019	100m Up to one year	Construction of Barton to Mixbury Cutting Temporary diversion north of HS2 earthworks stockpile during construction of the cutting.
Featherbed Lane	Mixbury	090+850	Nov 2018	100m Up to one year	Construction of Featherbed Lane Overbridge Temporary diversion to 303/7/10 during construction of the overbridge.
303/4/20 (public bridleway)	Mixbury	091+700	May 2018	50m Up to one year	Construction of Bridleway 303/4 Overbridge Remains open during construction of offline overbridge with temporary closure or slight diversion during construction of tie-in.
303/4/10 (public bridleway)	Westbury	092+400	Jan 2018	300m Approximately 20-24 months	Construction of Westbury Viaduct Temporary diversion along the old railway line during construction of the viaduct abutment
303/5/10 (public bridleway)	Westbury	092+400	Jan 2018	300m Approximately 20-24 months	Construction of Westbury Viaduct Temporary diversion along the old railway line during construction of the viaduct abutment
A422 Brackley Road	Westbury	093+600	Sep 2017	200m Up to one year and six months	Construction of A422 Brackley Road Overbridge Temporary diversion to temporary offline highway diversion.
TUW/3/2 (public footpath)	Turweston	094+500	Dec 2018	550m Up to one year	Construction of Turweston Cutting Temporary diversion along the eastern side of Proposed Scheme during construction of the approach cutting.

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
TUW/4/2 (public bridleway)	Turweston	094+750	Dec 2017	100m Up to one year	Construction of Turweston Green Overbridge Bridleway TUW/4/2 temporarily diverted together with Turweston Road during construction of green bridge.
TUW/5/1 (public footpath)	Turweston	94+600	Dec 2017	100m Up to one year	Construction of Turweston Green Overbridge Temporary diversion along east side of trace to temporary crossing north of the green bridge
TUW/9/2 (public footpath)	Turweston	94+600	Dec 2017	100m Up to one year	Construction of Turweston Green Overbridge Temporary diversion along western side of HS2 along Turweston Road temporary diversion.
TUW/4/3 (public bridleway)	Turweston	94+800	Dec 2017	50m Up to one year	Construction of Turweston Green Overbridge Temporary diversion along western side of HS2 along Turweston Road temporary diversion.
BD8 (public footpath)	Brackley	096+100	May 2019	800m Up to six months	Construction of Helmdon Embankment Temporary diversion along the eastern side of the Proposed Scheme during construction of the viaduct northern approach embankment.
AX16 (public bridleway)	Radstone	097+000	Nov 2017	100m Up to nine months	Construction of Bridleway AX16 Accommodation overbridge Temporary diversion to the west of existing route during construction of the overbridge.
AX14 (public bridleway)	Radstone	097+300	Feb 2019	300m Approximately 14-18 months	Construction of Brackley South Cutting Temporary diversion to the east of construction boundary during construction of HS2 earthworks.
AX19 (public bridleway)	Radstone	098+300	Apr 2019	600m Up to nine months	Construction of Brackley North Cutting Remains open during construction of overbridge with temporary diversion to AX5 during earthworks, before diversion along the western side of the Proposed Scheme and across overbridge to rejoin Radstone Road.

- 7.10.60 The following PRoW will be temporarily diverted by a negligible distance during construction of the Proposed Scheme and are therefore not considered to be substantially impacted:
- AX18 (public bridleway); and
 - AX5 (public footpath).
- 7.10.61 The following PRoW are likely to remain open during construction of the Proposed Scheme and are therefore not considered to be impacted:
- A4421 Buckingham Road;
 - 213/4/10 (public bridleway);
 - WBB/17/1 (public footpath);
 - TUW/7/1 (public footpath);
 - BD7 (public bridleway);
 - BD10 (public bridleway);
 - AX15 (public footpath);
 - AX7 (public footpath);
 - Radstone Road; and
 - AX6 (public footpath).
- 7.10.62 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:
- A4421 Buckingham Road;
 - 213/4/10 (public bridleway);
 - 303/7/10 (public footpath);
 - Bridleway 303/4 Overbridge 303/4/20 (public bridleway);
 - 303/4/10 (public bridleway);
 - 303/5/10 (public bridleway);
 - A422 Brackley Road;
 - TUW/3/2 (public footpath);
 - TUW/7/1 (public footpath);
 - BD8 (public footpath);
 - BD10 (public bridleway);

- BD7 (public bridleway);
- A43 Oxford Road;
- AX16 (public bridleway);
- AX15 (public footpath);
- AX7 (public footpath);
- Radstone Road;
- AX19 (public bridleway);
- Public Footpath AX5;
- Public Bridleway AX18; and
- Public Footpath AX6.

Utilities works

- 7.10.63 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area. Minor utilities works are expected to result in only localised traffic and pedestrian diversions, which will be of short duration. No additional impacts are expected due to utilities works.
- 7.10.64 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Major highways within the study area which will be affected by utility works are:
- A421 London Road;
 - A43 Oxford Road; and
 - Radstone Road.

Avoidance and mitigation measures

- 7.10.65 The following have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- transporting construction materials and equipment along haul roads adjacent to the route of the Proposed Scheme where reasonably practicable to reduce lorry movements on the public highway;
 - the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in reduced diversions of traffic onto alternative routes;
 - provision of temporary alternative routes and/or building structures early to maintain connectivity for PRoW closed during construction to reduce loss of amenity;
 - HGV routeing as far as reasonably practicable along the strategic road network, and using designated access roads, as shown in Volume 5: Map TR-03-056 (Volume 5, Traffic and transport Map Book); and
 - providing on-site accommodation and welfare facilities in adjacent CFA to reduce daily travel by site workers.
- 7.10.66 The draft CoCP (see Volume 5: Appendix CT-003-000/1) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.
- 7.10.67 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported through an overarching framework travel plan⁸ that will require travel plans to be used, along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where reasonably practicable this will encourage the use of sustainable modes of transport or vehicle sharing.
- 7.10.68 The reductions in traffic generation arising from the travel plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.

⁸ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective

- 7.10.69 The measures in the draft CoCP (Section 14.2) will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during construction of the Proposed Scheme on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.
- 7.10.70 Specific measures will include:
- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the morning peak hour and depart after the evening peak hour (although the assessment has assumed that some work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario) (draft CoCP Section 5); and
 - excavated material will be reused where reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15.2).

- 7.10.71 No other mitigation measures during construction of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Newton Purcell to Brackley (CFA14) construction impacts

Key construction transport issues

- 7.10.72 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.
- construction vehicle movements to and from the construction compounds;
 - temporary road closures and associated diversions of motorised users; and
 - temporary PRoW closures and associated diversions of non-motorised users.
- 1.1.3 No substantial traffic and transport impacts are expected on waterways and canals, public transport interchanges, parking and loading, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.10.73 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.

7.10.74 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-150 and Table 7-151 for AM peak and PM peak flows respectively.

Table 7-150: Newton Purcell to Brackley strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction	2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A422 Brackley Road, between A43 Oxford Road and A422 Brackley Road overbridge satellite compound	EB	371	492	621	102	129	92	26%	923%
	WB	357	444	572	99	129	92	29%	1282%
A4421 Buckingham Road, between A421 London Road and Bicester Road (Bicester)	NB	465	515	546	13	31	1	6%	13%
	SB	551	611	620	13	9	1	1%	5%
A421 London Road, between A4421 Buckingham Road and A421 London Road overbridge satellite compound	EB	473	524	607	46	82	21	16%	87%
	WB	410	454	520	47	66	21	15%	77%
A43 between M40 j10 and A421 London Road	NB	1097	1264	1402	260	138	89	11%	52%
	SB	1132	1343	1432	246	89	89	7%	57%
A43 Oxford Road between A421 London Road and the A43 Oxford Road/A422 Brackley Road junction	NB	1132	1299	1441	250	142	93	11%	59%
	SB	1508	1719	1813	294	94	93	5%	46%
A43 Oxford Road, between A422 Brackley Road (west) and A422 Brackley Road (east)	NB	1216	1420	1562	255	142	93	10%	57%
	SB	1433	1588	1682	299	94	93	6%	45%
B4525 Welsh Lane, between A43 Oxford Road and Radstone Road (CFA15)	EB	234	268	272	15	4	4	2%	35%
	WB	217	249	289	12	41	4	16%	47%

Table 7-151: Newton Purcell to Brackley strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A422 Brackley Road, between A43 Oxford Road and A422 Brackley Road overbridge satellite compound	EB	315	434	559	93	125	90	29%	3421%
	WB	336	469	594	94	125	90	27%	2514%
A4421 Buckingham Road, between A421 London Road and Bicester Road (Bicester)	NB	676	752	763	15	11	0	1%	1%
	SB	490	546	577	6	32	0	6%	5%
A421 London Road, between A4421 Buckingham Road and A421 London Road overbridge satellite compound	EB	405	451	510	36	59	19	13%	116%
	WB	476	530	599	37	69	19	13%	109%
A43 between M40 j10 and A421 London Road	NB	1497	1711	1798	254	87	86	5%	52%
	SB	1672	1898	2031	248	133	86	7%	54%
A43 Oxford Road between A421 London Road and the A43 Oxford Road/A422 Brackley Road junction	NB	1672	1886	1977	252	91	91	5%	56%
	SB	1217	1443	1580	207	137	91	9%	78%
A43 Oxford Road, between A422 Brackley Road (west) and A422 Brackley Road (east)	NB	1506	1674	1765	251	91	91	5%	57%
	SB	1333	1556	1693	212	137	91	9%	75%
B4525 Welsh Lane, between A43 Oxford Road and Radstone Road (CFA15)	EB	220	254	290	6	36	1	14%	29%
	WB	190	219	220	6	1	1	1%	29%

7.10.75 During the construction period the following road within the local network will be affected by the proposed highway works:

- Featherbed Lane (also known as Fulwell Lane) – temporary road closure and diversion of motorised users, to allow construction of Featherbed Lane overbridge.

7.10.76 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-152 and Table 7-153 for AM peak and PM peak flows respectively.

Table 7-152: Newton Purcell to Brackley local road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Manor Farm Lane, between School End and A421 Buckingham Road	EB		22	24	29	1	6	1	24%
	WB		15	17	25	0	8	0	50%
Turweston Farm Track/Oatleys Road	EB		5	6	14	0	9	0	146%
	WB		8	9	9	0	0	0	0%
Featherbed Lane (also known as Fulwell Lane), between the Proposed Scheme and A421 London Road	NB		24	26	30	3	4	3	16%
	SB		20	22	77	3	54	3	245%
Radstone Road, between Radstone Road overbridge satellite compound and B4525 Welsh Lane (CFA15)	NB		74	84	124	1	40	1	48%
	SB		119	134	175	1	40	1	30% 164%
Fulwell Road/Valley Road/Mere Road/Sandpit Hill, between A421 London Road (Finmere) and Featherbed Lane	EB		18	19	42	3	22	0	114%
	WB		28	31	107	1	76	1	249%
Turweston Road/South Bank	NB		19	21	30	0	9	0	40%
	SB		31	35	35	0	0	0	0%

Table 7-153: Newton Purcell to Brackley local road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Manor Farm Lane, between School End and A421 Buckingham Road	EB		22	25	35	0	11	0	43%
	WB		14	15	23	0	8	0	50%
Turweston Farm Track/Oatleys Road	EB		5	5	5	0	0	0	0%
	WB		6	7	15	0	8	0	114%
Featherbed Lane (also known as Fulwell Lane), between the Proposed Scheme and A421 London Road	NB		16	18	67	1	49	1	276%
	SB		14	16	17	1	1	1	9%
Radstone Road, between Radstone Road overbridge satellite compound and B4525 Welsh Lane (CFA15)	NB		95	108	145	1	37	0	34%
	SB		61	70	107	0	37	0	53%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Fulwell Road/Valley Road/Mere Road/Sandpit Hill, between A421 London Road (Finmere) and Featherbed Lane	EB		15	16	80	1	63	0	393% 0%
	WB		19	21	38	0	18	0	86% 0%
Turweston Road/South Bank	NB		29	33	33	0	0	0	0% 0%
	SB		15	18	26	0	8	0	45% 0%

- 7.10.77 Roads on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users (although in addition may also have an increase in other traffic generated by the construction of the Proposed Scheme) are:
- A421 London Road (between Featherbed Lane and A4421, Fulwell Road/Valley Road/Mere Road/Sandpit Hill (between Featherbed Lane and A421), for approximately up to one year from November 2018.
- 7.10.78 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:
- A421 London Road (between the boundary with CFA13 and the A43 Oxford Road);
 - A43 Oxford Road (between M40 and A422 Brackley Road); and
 - A422 Brackley Road (between A43 Oxford Road and the Proposed Scheme).
- 7.10.79 The HGVs used for the transportation of construction materials and equipment will use designated lorry routes as described in Section 7.10.52. Workforce traffic has been assigned to the same roads and additionally Turweston Farm Track/Oatleys Road, Fulwell Road and Turweston Road/South Bank. Some of these roads may also have an increase in other Proposed Scheme traffic.
- 7.10.80 The implementation of the draft CoCP (see Volume 5: Appendix CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

Junction performance

- 7.10.81 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.
- 7.10.82 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are listed below. All junctions are non-priority junctions.
- M40 J10 with A43 Oxford Road ;
 - A43 Oxford Road with B4100;
 - A43 Oxford Road with A421 London Road and B4031;
 - A43 Oxford Road with A422 Brackley Road;
 - A43 Oxford Road with A422 Brackley Road and A4421 Buckingham Road;
 - A43 Oxford Road with B4525 Welsh Lane;
 - A422 Brackley Road with Turweston Road/South Bank;
 - A421 London Road with Featherbed Lane; and
 - A421 London Road with A4421 Buckingham Road and Sandpit Hill.
- 7.10.83 Of the junctions above, A422 Brackley Road with Turweston Road/South Bank and A421 London Road with Featherbed Lane are priority junctions which meet the junction assessment criteria. The 2021 traffic flows with Proposed Scheme traffic (in PCU) at these priority junctions are shown in Table 7-15 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

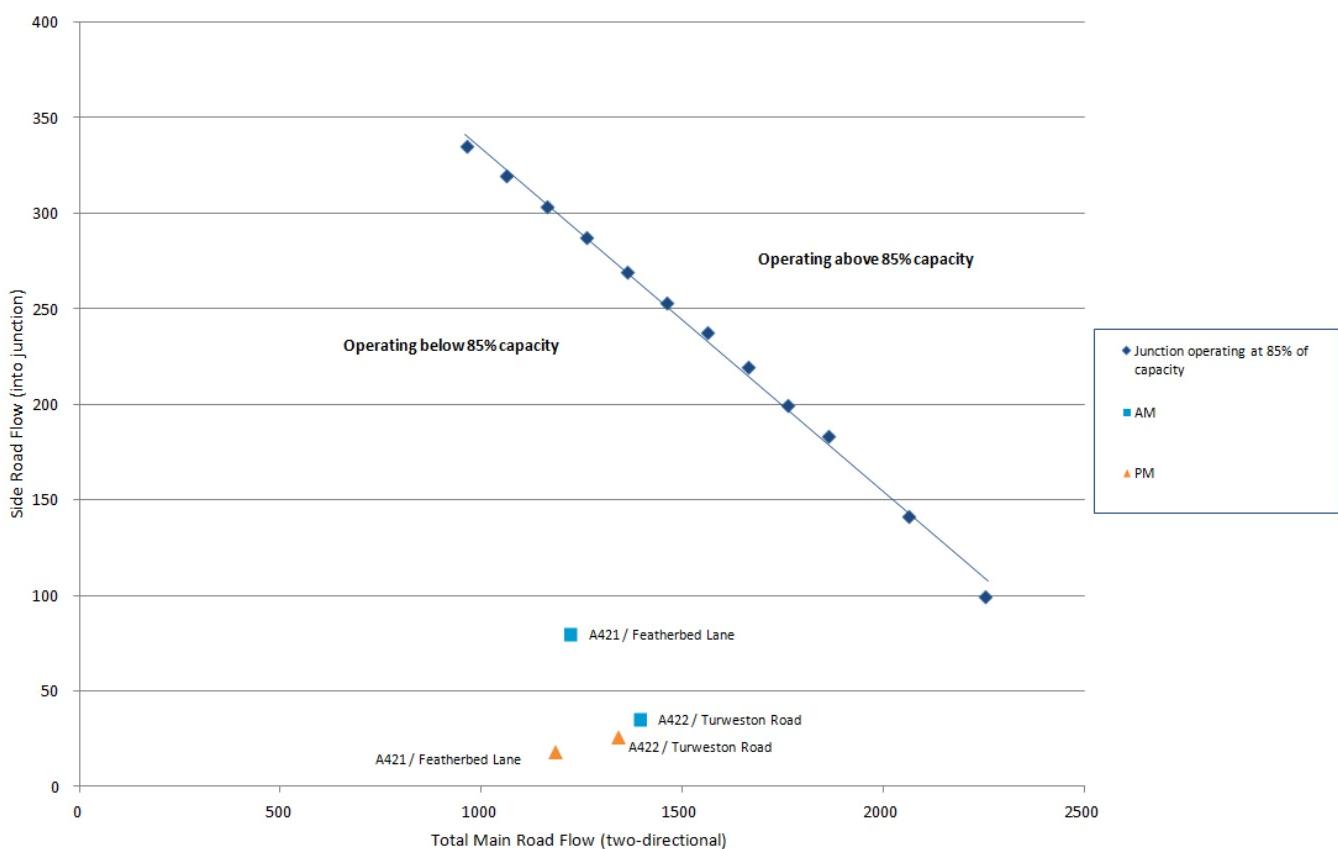
Table 7-154 Newton Purcell to Brackley priority junction flows

Junction	2021 With HS2 construction traffic			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A421 London Road with Featherbed Lane	1220	80	1182	18
A422 Brackley Road with Turweston Road/South Bank	1393	35	1340	26

- 7.10.84 The priority junctions have been plotted on a graph, shown in Figure 7-15, which shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

- 7.10.85 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-15: Newton Purcell to Brackley priority junction assessment 2021



- 7.10.86 The graph illustrates that all affected priority junctions in the study area fall below the 'threshold' of capacity during both AM and PM peaks and are therefore not forecast to be close to their theoretical capacity of 85% during construction of the Proposed Scheme. As a result, they are not considered to warrant individual assessment and have therefore not been assessed with junction assessment software.

- 7.10.87 A qualitative assessment has been carried out for the M40 J10 with A43 Oxford Road , A43 Oxford Road with B4100, A43 Oxford Road with A421 London Road and B4031, A43 Oxford Road with A422 Brackley Road, A43 Oxford Road with A422 Brackley Road and A4421 Buckingham Road, A43 Oxford Road with B4525 Welsh Lane, and A421 London Road with A4421 Buckingham Road and Fulwell Road (Oxfordshire)junctions as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows (including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.
- 7.10.88 The assessment indicates that increased traffic during the most intensive periods of construction is unlikely to cause additional traffic congestion and delay at the following junction during peak periods:
- A43 Oxford Road with B4525 Welsh Lane.
- 7.10.89 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the following junction during peak periods:
- A421 London Road with A4421 Buckingham Road and Sandpit Hill.
- 7.10.90 The assessment indicates that increased traffic during the most intensive periods of construction has a high potential to cause additional intermittent traffic congestion and delay at the following junctions during peak periods:
- M40 J10 with A43 Oxford Road ;
 - A43 Oxford Road with B4100;
 - A43 Oxford Road with A421 London Road and B4031;
 - A43 Oxford Road with A422 Brackley Road; and
 - A43 Oxford Road with A422 Brackley Road and A4421 Buckingham Road.

Accidents and safety

- 7.10.91 The baseline interrogation of accident data identified one cluster of nine or more accidents on the road network subject to assessment in the study area, being the junction of the A43 with the M40, where 10 accidents were recorded between 2007 and 2009.
- 7.10.92 During construction, there will only be a 5% increase in traffic flow on the A43 during peak periods, which is unlikely to have a substantial adverse impact upon road safety at the junction of the M40 with the A43 Oxford Road .

Pedestrians, cyclists and equestrians

- 7.10.93 The review of PRoW links indicates there will be additional walking distances on 19 routes due to temporary realignments, with five of these realigned links requiring a diversion of than 500m.
- 7.10.94 Table 7-155 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.10.95 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-060b to CT-05-068a (Volume 2, Map Book 14).

Table 7-155: Newton Purcell to Brackley summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
308/2/10 (public footpath)	Newton Purcell	087+500	Barton Hartshorn Embankment	Temporary diversion along south of construction works stockpile.	No data available	700m	8min
308/3/20 (public footpath)	Newton Purcell	087+500	Barton Hartshorn Embankment	Temporary diversion along south of construction works stockpile.	No data available	700m	8min
213/7/20 (public bridleway)	Newton Purcell	088+700	Construction of Bridleway 213/7 Overbridge	Temporary diversion on the eastern side of construction works for overbridge structure with potential for temporary closure or slight diversion during construction of tie-in.	0	100m	1min
A421 London Road	Mixbury	089+875	Construction of A421 London Road Overbridge	Temporary diversion to the temporary road diversion.	1	100m	1min
303/7/10 (public footpath)	Mixbury	090+650	Construction of Barton to Mixbury Cutting	Temporary diversion north of HS2 earthworks stockpile during construction of the cutting.	1	100m	1min
Featherbed	Mixbury	090+850	Construction of Featherbed	Temporary diversion to 303/7/10 during	1	100m	1min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Journey Time (nearest minute)
Lane			Lane Overbridge	construction of the overbridge.			
303/4/20 (public bridleway)	Mixbury	091+700	Construction of Bridleway 303/4 Overbridge	Remains open during construction of offline overbridge with temporary closure or slight diversion during construction of tie-in.	63	50m	1min
303/4/10 (public bridleway)	Westbury	092+400	Construction of Westbury Viaduct	Temporary diversion along the old railway line during construction of the viaduct abutment	No data available	300m	4min
303/5/10 (public bridleway)	Westbury	092+400	Construction of Westbury Viaduct	Temporary diversion along the old railway line during construction of the viaduct abutment	16	300m	4min
A422 Brackley Road	Westbury	093+600	Construction of A422 Brackley Road Overbridge	Temporary diversion to temporary offline highway diversion.	2	200m	2min
TUW/3/2 (public footpath)	Turweston	094+500	Construction of Turweston Cutting	Temporary diversion along the eastern side of Proposed Scheme during construction of the approach cutting.	14	550m	7min
TUW/4/2 (public bridleway)	Turweston	094+750	Construction of Turweston Green Overbridge	Bridleway TUW/4/2 temporarily diverted together with Turweston Road during construction of green bridge.	No data available	100m	1min
TUW/5/1 (public footpath)	Turweston	94+600	Construction of Turweston Green Overbridge	Temporary diversion along east side of trace to temporary crossing north of the green bridge	11	100m	1min
TUW/9/2 (public footpath)	Turweston	94+600	Construction of Turweston Green Overbridge	Temporary diversion along western side of HS2 along Turweston Road temporary diversion.	No data available	100m	1min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
TUW/4/3 (public bridleway)	Turweston	94+800	Construction of Turweston Green Overbridge	Temporary diversion along western side of HS2 along Turweston Road temporary diversion.	No data available	50m	1min
BD8 (public footpath)	Brackley	096+100	Construction of Helmdon Embankment	Temporary diversion along the eastern side of the Proposed Scheme during construction of the viaduct northern approach embankment.	11	800m	10min
AX16 (public bridleway)	Radstone	097+000	Construction of Bridleway AX16 Accommodation overbridge	Temporary diversion to the west of existing route during construction of the overbridge.	11	100m	1min
AX14 (public bridleway)	Radstone	097+300	Construction of Brackley South Cutting	Temporary diversion to the east of construction boundary during construction of HS2 earthworks.	1	300m	4min
AX19 (public bridleway)	Radstone	098+300	Construction of Brackley North Cutting	Remains open during construction of overbridge with temporary diversion to AX5 during earthworks, before diversion along the western side of the Proposed Scheme and across overbridge to rejoin Radstone Road.	6	600m	7min

Newton Purcell to Brackley (CFA14) Proposed Scheme operation description

Operation trip assumptions

- 7.10.96 It is forecast that there will be no substantial changes in demand on existing transport infrastructure within the study area for 2026 and 2041.

Avoidance and mitigation measures

- 7.10.97 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:

- retaining all roads crossing the Proposed Scheme in their current location, or very close to their current location resulting in no substantial diversions of traffic onto alternative routes; and
- retaining all PRoW crossing the Proposed Scheme, with localised realignments or diversions kept to a minimum.

7.10.98 No other mitigation measures during operation of the Proposed Scheme are considered necessary based on the outcome of this assessment.

Newton Purcell to Brackley (CFA14) operation impacts

7.10.99 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.

7.10.100 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.

Key operation transport issues

7.10.101 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.

- permanent removal of bus stops; and
- permanent realignment or closure of PRoW and associated diversions to non-motorised users.

7.10.102 No substantial traffic and transport impacts are expected on the highway network, waterways and canals, rail services, parking and loading, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

7.10.103 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.

7.10.104 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.

7.10.105 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows with the Proposed Scheme are expected to remain the same as the 2026 and 2041 future baseline traffic flows. Therefore, no traffic impact assessment of operation of the Proposed Scheme is necessary in this study area.

Accidents and safety

- 7.10.106 The baseline interrogation of accident data identified one cluster of nine or more accidents on the road network subject to assessment in the study area, being the junction of the M40 with the A43 Oxford Road , where 10 accidents were recorded between 2007 and 2009.
- 7.10.107 However, there will be no impact on highway accidents and safety risk in the study area as there are no increases in traffic due to operation of the Proposed Scheme.

Public transport interchange

- 7.10.108 Table 7-156 identifies the public transport interchanges in the study area that will change in function during operation of the Proposed Scheme.

Table 7-156: Newton Purcell to Brackley permanent changes to public transport interchanges

Public transport interchange	Description	Combined Service Frequency (potential max per hour)	Approximate distance to alternative stops	Approximate impact of using alternative stops on journey time (nearest minute)
Bus stops on A4421 Buckingham Road	Permanent removal of bus stops due to realignment of A4421 Buckingham Road	One	350m	4 min

Pedestrians, cyclists and equestrians

- 7.10.109 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.
- 7.10.110 The review of PRoW links indicates that there will be additional walking distances on 23 routes due to permanent realignments, with one of these realigned links requiring a diversion of more than 500m.
- 7.10.111 Table 7-157 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.10.112 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-06ob to CT-06-068a (Volume 2, Map Book 14).

Table 7-157: Newton Purcell to Brackley summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
A4421 Buckingham Road	Newton Purcell	088+075	Permanent diversion across realigned road.	0	100m	1 min
213/4/10 (public bridleway)	Newton Purcell	089+375	Permanent diversion via Bridleway 213/4 accommodation overbridge.	0	150m	2 min
303/7/10 (public footpath)	Mixbury	090+650	Permanent diversion across Featherbed Lane overbridge and along eastern side of HS2 to rejoin existing footpath alignment.	1	100m	1 min
Bridleway 303/4 Overbridge 303/4/20 (public bridleway)	Mixbury	091+700	Permanent diversion across Bridleway 303/4 overbridge.	63	50m	1 min
303/4/10 (public bridleway)	Westbury	92+400	Permanent diversion under Westbury viaduct.	No data available	100m	1 min
303/5/10 (public bridleway)	Westbury	92+400	Permanent diversion under Westbury viaduct.	16	100m	1 min
A422 Brackley Road	Westbury	093+600	Permanent diversion to realigned road.	1	100m	1 min
TUW/3/2 (public footpath)	Turweston	094+500	Permanent diversion along reinstated Turweston Road and via bridleway TUW/9/2 to rejoin existing footpath alignment.	14	300m	4 min
TUW/7/1 (public footpath)	Turweston	095+425	Permanent diversion under viaduct.	28	300m	4 min
BD8 (public footpath)	Brackley	096+100	Permanent diversion under Turweston viaduct.	11	700m	8 min
BD10 (public bridleway)	Brackley	96+300	Permanent diversion along the new bridleway alignment to join the new underpass.	0	200m	2 min
BD7 (public bridleway)	Brackley	96+300	Permanently diverted along the new bridleway alignment to join the new underpass.	11	200m	2 min
A43 Oxford Road	Brackley	096+490	Permanent diversion to the west of existing alignment.	No data available	200m	2 min
AX16 (public bridleway)	Radstone	097+000	Permanent diversion across Bridleway AX16 accommodation overbridge	11	50m	1 min

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
AX15 (public footpath)	Radstone	097+650	Permanent diversion to Footpath AX15 overbridge	0	100m	1 min
AX7 (public footpath)	Radstone	097+900	Permanent diversion to Radstone Road.	0	300m	4 min
Radstone Road	Radstone	098+130	Permanent diversion to the west of existing alignment.	6	100m	1 min
AX19 (public bridleway)	Radstone	098+300	Permanently diverted to Bridleway AX18 overbridge	6	500m	6 min
Public Footpath AX5	Radstone	098+400	Permanently diverted to Bridleway AX18 overbridge	0	50m	1 min
Public Bridleway AX18	Radstone	098+400	Permanently diverted to Bridleway AX18 overbridge	0	50m	1 min
Public Footpath AX6	Radstone	099+200	Permanent diversion to the north of existing alignment.	No data available	30m	Negligible

7.10.113 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

7.11 Greatworth to Lower Boddington (CFA15)

Greatworth to Lower Boddington (CFA15) Proposed Scheme description

- 7.11.2 The Proposed Scheme through the study area will be approximately 17km in length, commencing to the south-east of Halse Copse South near Radstone. The route will then proceed north in a tunnel, passing just east of Greatworth, and will emerge from tunnel to pass over Lower Thorpe on a viaduct. It will continue north in cuttings and on embankments before passing west of Trafford Bridge (east of Edgcote) on a viaduct. It will then enter into a tunnel to pass east of Chipping Warden, emerging west of Aston Le Walls where it will cross over a viaduct before passing to the west of Lower Boddington in cuttings and on embankments.
- 7.11.3 The area is predominantly rural land, with agriculture being the main land use. Development is typically small villages and farmsteads. From south to north, villages within proximity of the route include Greatworth Thorpe Mandeville, Edgcote, Chipping Warden, Aston Le Walls, Lower Boddington and Upper Boddington.
- 7.11.4 The Greatworth to Lower Boddington study area includes the A423 Southam Road (north of A422 Hennef Way), A422 (A423 Southam Road to B4525 Banbury Lane), A361 Williamsot Hill/Banbury Road/Byfield Road/Badby Road West (M40 to A45 Stefen Way), B4525 Banbury Lane (A422 to A43) and local roads that either cross the Proposed Scheme or are in close proximity to it. The Proposed Scheme crosses 11 roads within the study area.
- 7.11.5 PRoW within the area include the Macmillan Way, which the Proposed Scheme crosses at Chipping Warden, the Battlefields Trail, which the Proposed Scheme crosses between Thorpe Mandeville and Chipping Warden, the Millennium Way, which the Proposed Scheme crosses once between Thorpe Mandeville and Chipping Warden, and once at Lower Boddington, and the Jurassic Way, which the Proposed Scheme crosses at Chipping Warden. The Proposed Scheme crosses PRoW in 36 locations within the study area. In addition to the 36 PRoW, the Proposed Scheme crosses 11 roads with potential for use by non-motorised users
- 7.11.6 The following section describes the main features of the Proposed Scheme in the study area. In general, features are described from south to north along the route (and east to west for features that cross the Proposed Scheme).
- 7.11.7 The key features of the Proposed Scheme within the context of the study area are shown on Figure 2, Volume 2, (CFA Report 21), Executive summary.
- 7.11.8 The Proposed Scheme will enter the Greatworth to Lower Boddington area on a low embankment just south-east of Halse Copse South. It will then pass into a cutting, before continuing onto another low embankment and shallow cutting to the east of Greatworth, north of the dismantled railway.

- 7.11.9 To the east of Greatworth the route will continue into the Greatworth green tunnel from which it will emerge just west of Sulgrave Road. Key features of this section will include the reinstatement of Helmdon Road over Greatworth green tunnel and the the reinstatement of the access to Greatworth Park.
- 7.11.10 The route will continue into Thorpe Mandeville cutting, beginning west of Sulgrave Road and extending to the west of Banbury Road. A key features of this section will include the diversion of Banbury Road on an overbridge.
- 7.11.11 This section of route comprises a series of short embankments, viaducts and cuttings and extends from just north of Banbury Road to east of bridleway AG9 near Lower Thorpe. A key feature of this section will include a viaduct to carry the Proposed Scheme over Lower Thorpe and Banbury Lane.
- 7.11.12 The route will continue into the Edgcote viaduct and adjacent earthworks area which comprises a series of embankments and cuttings and a viaduct. This section of the Proposed Scheme extends from east of bridleway AG9 near Lower Thorpe to west of Culworth Road. Key features of this section will include an overbridge north-west of Lower Thorpe and a viaduct at Edgcote carrying the Proposed Scheme over Wardington Road and the River Cherwell. Culworth Road will be closed either side of the Proposed Scheme.
- 7.11.13 The route will continue into the green tunnel at Chipping Warden, emerging again to the east of Highfurlong Brook. A key feature of this section will include the reinstatement of the A361 Byfield Road.
- 7.11.14 The Proposed Scheme will continue into the Highfurlong Brook viaduct and adjacent earthworks section, which comprises a series of embankments and cuttings and a stretch of viaduct over the Highfurlong Brook. This section of the Proposed Scheme extends from east of Highfurlong Brook to west of Claydon Road. Key features of this section will include a viaduct to carry the Proposed Scheme over Highfurlong Brook and an overbridge to provide an online replacement of Claydon Road.
- 7.11.15 The Proposed Scheme will continue into the Lower Boddington open section which comprises an embankment and a cutting approximately. This section of the Proposed Scheme extends from north of Claydon Road (Lower Boddington) to the Northamptonshire County boundary near Stoneton Lane. A key feature of this section will include the realignment of Claydon Road (Upper Boddington), west of its current position, to the north of the Proposed Scheme to connect to Banbury Road. Stoneton Lane will be diverted alongside the Proposed Scheme to the east to connect into Banbury Road.
- 7.11.16 The Proposed Scheme will then continue into the Ladbroke and Southam area (CFA16) in cutting.

- 7.11.17 The link capacities of roads within the study area have been analysed to understand if they would experience congestion in the future baseline, without the Proposed Scheme. Within the study area, link capacities have been assessed for roads affected by the Proposed Scheme during construction (2021 baseline) and operation (2026 and 2041 baselines).
- 7.11.18 Link capacities have been estimated from Design Manual for Roads and Bridges (DMRB) note titled 'Traffic Capacity of Urban Roads' (TA 79/99). Firstly, all links with a one-way flow exceeding 1000 vehicles per hour in the 2021, 2026 and 2041 baselines have been highlighted as this is considered to represent a threshold for all single carriageway link types, above which the capacity is likely to be constrained, based on consideration of the information in this note. For each of the road links above the threshold, the speed limit, type of road, number of traffic lanes and carriageway width have been used to estimate the link capacity from the DMRB's specification.

Greatworth to Lower Boddington (CFA15) assessment methodology

- 7.11.19 The assessment methodology used is described in Section 5 and Section 7.2 of this Transport Assessment report. Future baseline traffic volumes have generally been calculated by applying growth factors derived from TEMPRO for the future years of 2021, 2026 and extrapolation to 2041. The assessment covers the AM (08:00-09:00) and PM (17:00-18:00) peak periods for an average weekday. The factors vary based upon individual road types and relevant wards.
- 7.11.20 Forecast future year traffic flows with and without the Proposed Scheme have been based on an approach that does not take account of wider impacts, such as redistribution and reassignment of traffic, modal shift and peak spreading. As a consequence, local transport impacts may be over-estimated.

Greatworth to Lower Boddington (CFA15) future baseline Key future baseline issues

- 7.11.21 Future baseline traffic flows on roads in the study area are forecast to increase irrespective of the Proposed Scheme. Future baseline traffic volumes in the peak hours are forecast to grow by the following percentages compared to 2012, depending on road type:
- Future year of assessment for construction of the Proposed Scheme, 2021: 12%-16%
 - Future year of assessment for first operation of the Proposed Scheme, 2026: 20%-27%
 - Future year of assessment 15 years after first operation of the Proposed Scheme, 2041: 36%-54%

7.11.22 As a result of this analysis, no roads subject to assessment within the study area are expected to experience substantial traffic congestion and delay in the 2021, 2026 or 2041 future baseline situation, without Proposed Scheme traffic.

7.11.23 There are no other key future baseline issues identified within the study area.

Land use assumptions

7.11.24 A review has been undertaken to understand what developments are in close proximity to the Proposed Scheme within the study area that may result in additional localised traffic growth not accounted for by the growth factors previously described.

7.11.25 Within the study area, there are no committed developments which are considered to require adjustment to the SPD quantums within TEMPRO, which already account for future development in the study area.

7.11.26 The TEMPRO growth factors used in the study area are shown in Table 7-158.

Table 7-158: Greatworth to Lower Boddington summary of percentage growth applied to traffic

Percentage Growth	2012-2021 (construction)	2012-2026 (operation)	2012-2041 (operation)
Minimum	12%	20%	36%
Maximum	16%	27%	54%
Average	14%	24%	45%

Transport growth assumptions

7.11.27 Future baseline transport supply has accounted for changes in the strategic and local road network in the study area, for assessment for years 2021, 2026 and 2041.

7.11.28 It has been assumed that bus services and PRoW usage, for future years of assessment will be the same as the 2012 baseline, since it is not possible to forecast how these may change in the future. No other changes to the transport baseline other than those to the road network are anticipated in the study area.

Strategic and local road network traffic flows

- 7.11.29 Roads within the study area subject to assessment are those where traffic volumes are anticipated to be impacted by the Proposed Scheme. Within this study area, the strategic and local roads affected by the Proposed Scheme are A423 Southam Road (north of A422 Hennef Way), A422 (A423 Southam Road to B4525 Banbury Lane), A361 Williamscot Hill/Banbury Road/Byfield Road/Badby Road West (M40 to A45 Stefen Way), B4525 Banbury Lane (A422 to A43), Radstone Road (Radstone), Helmdon Road (Greatworth), Marston Road (Greatworth to B4525), Sulgrave Road (South of Banbury Road), Banbury Road (B4525 to Sulgrave Road), Banbury Lane (Banbury Road to Culworth), Wardington Road, Culworth Road (Chipping Warden), Appletree Road (Chipping Warden), Welsh Road (Trafford Bridge to Banbury Road), Banbury Road (Lower Boddington), Claydon Road (also known as Hill Road), and Claydon Road (also known as Boddington Road).
- 7.11.30 Current (2012) and future year baseline traffic flows for 2021, 2026 and 2041, for all roads within the study area impacted by the Proposed Scheme, are presented below. Flows are also shown in the Baseline Survey Report in Annex B (iv).
- 7.11.31 The percentage change listed has been calculated from average traffic flows over the two week ATC data collection period which, in many cases, gave rise to traffic flows listed as a decimal and later rounded to the nearest vehicle. The percentages listed in the tables are therefore representative of the actual traffic flows rather than the rounded traffic flows presented in the tables.
- 7.11.32 Traffic flow changes assigned to the strategic road network impacted by the Proposed Scheme within the study area, are presented in Table 7-159 Table 7-159: Greatworth to Lower Boddington strategic road network future baseline flows (vehicles) - AM peak and Table 7-160 for AM peak and PM peak flows respectively.
- 7.11.33 The A423 Southam Road north of Banbury and the A422 Hennef Way in Banbury between the A423 Southam Road and the M40, junction 11 have been included in the neighbouring Ladbroke & Southam area (CFA16) section of the report. This is because the impacts on these roads due to the construction of the Proposed Scheme originate in the Ladbroke & Southam area.
- 7.11.34 Traffic flow changes assigned to the local road network impacted by the Proposed Scheme within the study area, where considered to be impacted by the Proposed Scheme, are shown in Table 7-161 and Table 7-162 for AM peak and PM peak flows respectively.

Accidents and safety

- 7.11.35 No accident clusters of nine or more accidents in a three year period have been identified on the road network subject to assessment in the study area through interrogation of accident data. Therefore, no further safety issues have been identified for future network operation as a result of changes to the highway network or travel demands.

Table 7-159: Greatworth to Lower Boddington strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A361 Byfield Road (south of Welsh Road, Chipping Warden)	NB	186	5	214	5	230	6	272	7	28	44	86	15%	23%	46%
	SB	484	8	555	9	597	10	705	12	71	113	221	15%	23%	46%
A361 Byfield Road (north of Welsh Road)	NB	186	5	214	5	230	6	272	7	28	44	86	15%	23%	46%
	SB	484	8	555	9	597	10	705	12	71	113	221	15%	23%	46%
B4525 Welsh Road (west of Greatworth)	EB	256	10	293	11	315	12	372	15	37	59	116	15%	23%	46%
	WB	261	7	299	8	322	9	380	10	38	61	119	15%	23%	46%
B4525 Banbury Lane (south-west of Banbury Lane, Thorpe Mandeville)	EB	330	11	378	13	407	14	480	16	48	77	150	15%	23%	46%
	WB	445	8	510	9	549	9	648	11	65	104	203	15%	23%	46%
B4525 Welsh Lane (Helmdon)	EB	234	9	268	11	289	12	348	14	34	55	114	15%	24%	49%
	WB	217	7	249	8	268	9	322	11	32	51	105	15%	24%	49%

Table 7-160: Greatworth to Lower Boddington strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
A361 Byfield Road (south of Welsh Road, Chipping Warden)	NB	485	4	560	4	605	4	726	5	75	120	241	15%	25%	50%
	SB	217	3	250	3	271	3	324	4	33	54	107	15%	25%	50%
A361 Byfield Road (north of Welsh Road)	NB	485	4	560	4	605	4	726	5	75	120	241	15%	25%	50%
	SB	217	3	250	3	271	3	324	4	33	54	107	15%	25%	50%
B4525 Welsh Road (west of Greatworth)	EB	236	4	272	4	294	4	352	5	36	58	116	15%	25%	50%
	WB	226	5	261	6	282	6	338	7	35	56	112	15%	25%	50%
B4525 Banbury Lane (south-west of Banbury Lane, Thorpe Mandeville)	EB	394	5	454	5	491	6	588	7	60	97	194	15%	25%	50%
	WB	303	5	349	6	378	6	453	7	46	75	150	15%	25%	50%
B4525 Welsh Lane (Helmdon)	EB	220	4	254	4	275	5	337	6	34	55	117	15%	25%	53%
	WB	190	4	219	4	237	5	290	6	29	47	100	15%	25%	53%

Table 7-161: Greatworth to Lower Boddington local road network future baseline flows (vehicles)- AM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Radstone Road (Radstone)	NB	74	0	74	0	74	0	74	0	0	0	0	0%	0%	0%
	SB	119	1	119	1	119	1	119	1	0	0	0	0%	0%	0%
Helmdon Road (Greatworth)	EB	37	1	42	1	45	1	54	1	5	8	17	15%	24%	49%
	WB	10	0	11	0	12	0	15	0	1	2	5	15%	24%	49%
Sulgrave Road (Thorpe Mandeville)	NB	64	1	73	1	79	1	95	1	9	15	31	15%	24%	49%
	SB	106	1	121	1	130	1	157	1	15	24	51	15%	24%	49%
Banbury Road (SW of Thorpe Mandeville) (Thorpe Mandeville)	EB	74	1	85	1	91	1	110	1	11	17	36	15%	24%	49%
	WB	184	1	210	1	227	1	273	1	26	43	89	15%	24%	49%
Banbury Road (Thorpe Mandeville)	EB	58	1	66	1	71	1	86	1	8	13	28	15%	24%	49%
	WB	162	1	185	1	200	1	240	1	23	38	78	15%	24%	49%
Banbury Lane (Thorpe Mandeville)	NB	17	0	19	0	20	0	25	0	2	3	8	15%	24%	49%
	SB	22	0	25	0	27	0	33	0	3	5	11	15%	24%	49%
Welsh Road (south of Trafford Bridge, Edgcote)	EB	46	1	53	1	57	1	68	1	7	11	22	15%	24%	49%
	WB	37	0	42	0	46	0	55	0	5	9	18	15%	24%	49%
Wardington Road (Edgcote)	EB	11	0	12	0	13	0	16	0	1	2	5	15%	24%	49%
	WB	10	0	11	0	12	0	14	0	1	2	4	15%	24%	49%
Welsh Road (north of	NB	33	0	38	0	40	0	49	0	5	7	16	15%	24%	49%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Trafford Bridge, Edgcote)	SB	34	1	39	1	42	1	51	1	5	8	17	15%	24%	49%
	EB	8	0	9	0	9	0	11	0	1	1	3	15%	24%	49%
Culworth Road (Chipping Warden)	WB	18	0	20	0	22	0	26	1	2	4	8	15%	24%	49%
	NB	33	0	38	0	40	0	49	0	5	7	16	15%	24%	49%
Welsh Road (north west of Culworth Rd, Chipping Warden)	SB	34	1	39	1	42	1	51	1	5	8	17	15%	24%	49%
	NB	7	0	8	0	9	0	10	0	1	2	3	15%	24%	49%
Appletree Lane (Aston le Walls)	SB	13	0	14	0	15	0	19	0	1	2	6	15%	24%	49%
	NB	7	0	8	0	9	0	11	0	1	2	4	15%	24%	49%
Claydon Road (also known as Hill Road, Lower Boddington)	SB	10	0	11	0	12	0	14	0	1	2	4	15%	24%	49%
	NB	27	1	31	1	33	1	40	1	4	6	13	15%	24%	49%
Banbury Road (east of Claydon Road) (Lower Boddington)	SB	24	1	28	1	30	1	36	1	4	6	12	15%	24%	49%
	NB	6	0	6	0	7	0	8	0	0	1	2	15%	24%	49%
Claydon Road (also known as Boddington Road, Lower Boddington)	SB	9	0	11	0	12	0	14	0	2	3	5	15%	24%	49%
	NB	26	0	30	0	32	0	38	0	4	6	12	15%	24%	49%
Banbury Road (west of Claydon Road, Boddington)	SB	24	0	27	0	29	0	35	1	3	5	11	15%	24%	49%
	NB	8	0	9	0	10	0	12	0	1	2	4	15%	24%	49%
Claydon Road (north of Banbury Road, Boddington)	SB	7	1	8	1	9	1	10	1	1	2	3	15%	24%	49%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Warwick Road (Boddington)	EB	22	0	26	0	28	0	33	-1	4	6	11	15%	24%	49%
	WB	79	3	91	3	98	3	118	4	12	19	39	15%	24%	49%
Banbury Road (east of Stoneton Road) (Boddington)	EB	46	0	53	0	57	0	68	0	7	11	22	15%	24%	49%
	WB	105	3	120	3	130	4	156	4	15	25	51	15%	24%	49%
Wormleighton Road (Boddington)	EB	108	1	124	1	133	1	161	1	16	25	53	15%	24%	49%
	WB	114	1	131	1	141	1	170	1	17	27	56	15%	24%	49%
Stoneton Lane (Boddington)	NB	14	1	16	1	17	1	21	1	2	3	7	15%	24%	49%
	SB	18	0	21	0	22	0	27	0	3	4	9	15%	24%	49%
Marston Road (Greatworth)	NB	38	0	44	1	47	1	57	1	6	9	19	15%	24%	49%
	SB	11	0	13	0	14	0	17	0	2	3	6	15%	24%	49%
Appletree Road (Chipping Warden)	EB	27	2	31	2	34	2	40	3	4	7	13	15%	24%	49%
	WB	112	2	128	2	138	2	166	3	16	26	54	15%	24%	49%
Welsh Rd (south east of Aston le Walls)	NB	42	0	48	0	52	0	62	0	6	10	20	15%	24%	49%
	SB	24	1	28	1	30	1	36	1	4	6	12	15%	24%	49%
Welsh Rd (north west of Aston le Walls)	NB	42	0	48	0	52	0	62	0	6	10	20	15%	24%	49%
	SB	24	1	28	1	30	1	36	1	4	6	12	15%	24%	49%

Table 7-162: Greatworth to Lower Boddington local road network future baseline flows (vehicles)- PM peak

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Radstone Road (Radstone)	NB	95	1	95	1	95	1	95	1	0	0	0	0%	0%	0%
	SB	61	0	61	0	61	0	61	0	0	0	0	0%	0%	0%
Helmdon Road (Greatworth)	EB	12	0	14	0	15	0	18	0	2	3	6	15%	25%	53%
	WB	27	0	31	0	33	0	40	0	4	6	13	15%	25%	53%
Sulgrave Road (Thorpe Mandeville)	NB	87	0	100	0	109	0	133	0	13	22	46	15%	25%	53%
	SB	55	0	63	0	68	0	83	0	8	13	28	15%	25%	53%
Banbury Road (SW of Thorpe Mandeville)	EB	158	1	182	1	197	1	241	2	24	39	83	15%	25%	53%
	WB	77	0	89	0	96	0	118	0	12	19	41	15%	25%	53%
Banbury Road (Thorpe Mandeville)	EB	139	1	160	1	173	1	212	2	21	34	73	15%	25%	53%
	WB	68	0	78	0	84	0	103	0	10	16	35	15%	25%	53%
Banbury Lane (Thorpe Mandeville)	NB	20	0	22	0	24	0	30	0	2	4	10	15%	25%	53%
	SB	10	0	11	0	12	0	15	0	1	2	5	15%	25%	53%
Welsh Road (south of Trafford Bridge, Edgcote)	EB	42	1	48	1	52	1	64	2	6	10	22	15%	25%	53%
	WB	37	0	43	0	46	0	57	0	6	9	20	15%	25%	53%
Wardington Road (Edgcote)	EB	8	0	9	0	10	0	12	0	1	2	4	15%	25%	53%
	WB	5	0	6	0	6	0	8	0	1	1	3	15%	25%	53%
Welsh Road (north of Trafford Bridge, Edgcote)	NB	32	0	37	0	40	0	49	0	5	8	17	15%	25%	53%
	SB	35	1	41	1	44	1	54	1	6	9	19	15%	25%	53%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
Culworth Road (Chipping Warden)	EB	16	0	18	0	20	0	24	0	2	4	8	15%	25%	53%
	WB	10	0	11	0	12	0	15	0	1	2	5	15%	25%	53%
Welsh Road (north west of Culworth Rd, Chipping Warden)	NB	32	0	37	0	40	0	49	0	5	8	17	15%	25%	53%
	SB	35	1	41	1	44	1	54	1	6	9	19	15%	25%	53%
Appletree Lane (Aston le Walls)	NB	13	0	15	0	16	0	20	0	2	3	7	15%	25%	53%
	SB	7	0	8	0	9	0	11	0	1	2	4	15%	25%	53%
Claydon Road (also known as Hill Road, Lower Boddington)	NB	9	0	10	0	11	0	13	0	1	2	4	15%	25%	53%
	SB	8	0	9	0	10	0	12	0	1	2	4	15%	25%	53%
Banbury Road (east of Claydon Road, Lower Boddington)	NB	29	0	34	0	36	0	45	0	5	7	16	15%	25%	53%
	SB	25	0	28	0	31	0	38	0	3	6	13	15%	25%	53%
Claydon Road (also known as Boddington Road, Lower Boddington)	NB	12	0	13	0	14	0	18	0	1	2	6	15%	25%	53%
	SB	7	0	8	0	9	0	11	0	1	2	4	15%	25%	53%
Banbury Road (west of Claydon Road, Boddington)	NB	27	0	31	0	33	0	41	0	4	6	14	15%	25%	53%
	SB	23	0	27	0	29	0	36	0	4	6	13	15%	25%	53%
Claydon Road (north of Banbury Road, Boddington)	NB	10	0	12	0	12	0	15	0	2	2	5	15%	25%	53%
	SB	8	0	9	0	10	0	12	0	1	2	4	15%	25%	53%
Warwick Road	EB	91	0	104	0	113	0	138	0	13	22	47	15%	25%	53%

Location	Direction	Baseline flow								All vehicles actual change from 2012			All vehicles % change from 2012		
		2012		2021		2026		2041		2021	2026	2041	2021	2026	2041
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV						
(Boddington)	WB	34	2	39	2	43	2	52	3	5	9	18	15%	25%	53%
Banbury Road (east of Stoneton Road, Boddington)	EB	114	0	131	0	142	0	174	0	17	28	60	15%	25%	53%
	WB	61	2	70	2	76	2	93	3	9	15	32	15%	25%	53%
Wormleighton Road (Boddington)	EB	110	0	127	0	137	0	168	0	17	27	58	15%	25%	53%
	WB	153	0	176	0	191	0	234	0	23	38	81	15%	25%	53%
Stoneton Lane (Boddington)	NB	22	0	25	0	27	0	34	0	3	5	12	15%	25%	53%
	SB	12	0	14	0	15	0	18	0	2	3	6	15%	25%	53%
Marston Road (Greatworth)	NB	11	0	12	0	13	0	16	0	1	2	5	15%	25%	53%
	SB	35	0	40	0	43	0	53	0	5	8	18	15%	25%	53%
Appletree Road (Chipping Warden)	EB	143	1	165	1	179	1	219	1	22	36	76	15%	25%	53%
	WB	31	0	35	0	38	0	47	1	4	7	16	15%	25%	53%
Welsh Rd (south east of Aston le Walls)	NB	29	0	33	0	36	0	44	1	4	7	15	15%	25%	53%
	SB	40	0	46	0	50	0	61	0	6	10	21	15%	25%	53%
Welsh Rd (north west of Aston le Walls)	NB	29	0	33	0	36	0	44	1	4	7	15	15%	25%	53%
	SB	40	0	46	0	50	0	61	0	6	10	21	15%	25%	53%

Greatworth to Lower Boddington (CFA15) Proposed Scheme construction descriptions

Construction activities

7.11.36 The major construction elements within the study area are as follows:

- Greatworth south cutting;
- Greatworth green tunnel;
- Thorpe Mandeville cutting;
- Lower Thorpe viaduct and adjacent earthworks;
- Edgcote viaduct and adjacent earthworks;
- Chipping Warden green tunnel;
- Highfurlong Brook viaduct and adjacent earthworks; and
- Lower Boddington open section.

7.11.37 Details of the construction phasing are provided in Volume 2, Section 2 and the main construction works and the time periods when each compound is operational are summarised in Figure 7-16.

Figure 7-16: Greatworth to Lower Boddington construction activity phasing

Construction activity	2017	2018	2019	2020	2021	2022	2023	2024	2025		
	quarters										
	1	2	3	4	1	2	3	4	1	2	3
Advance works (Summary)											
Advance works		■									
Civil engineering works											
Brackley South Cutting Main Compound (280/06)					■	■	■	■			
Radstone Road Overbridge Satellite Compound (280/07)					■	■	■	■			
Greatworth Green Tunnel satellite compound (290/01)			■		■	■	■	■			
Chipping Warden Green Tunnel Main Compound (290/05)					■	■	■	■			
Thorpe Mandeville Cutting Satellite Compound (290/02)			■		■	■	■	■			
Lower Thorpe Viaduct Satellite Compound (290/03)			■		■	■	■	■			
Culworth Cutting Satellite Compound (290/04)			■		■	■	■	■			
Claydon Road Overbridge Satellite Compound (290/06)			■		■	■	■	■			
Banbury Road Satellite Compound (290/07) (C222 Use)			■		■	■	■	■			
Banbury Road Satellite Compound (290/07) (C223 Use)			■		■	■	■	■			
Rail infrastructure and systems works											

Construction activity	2017				2018				2019				2020				2021				2022				2023				2024			
	quarters				quarters				quarters				quarters				quarters				Quarters				quarters				quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Greatworth Green tunnel (south portal) satellite compound (0290/01)																																
Greatworth Green tunnel (north portal) satellite compound (015/102)																																
Danes Moor ATS satellite compound (015/103)																																
Chipping Warden Green tunnel south portal satellite compound (015/104)																																
Chipping Warden Green tunnel north portal satellite compound (015/105)																																
Boddington ATS satellite compound (016/101)																																
Commissioning																																
Commissioning (until end 2026)																																

Compounds and construction sites

- 7.11.38 Main site compounds would be used for core project management (engineering, planning and construction delivery), commercial, and administrative staff. Satellite site compounds would generally be smaller in size, providing office accommodation for limited numbers of staff. There is overnight accommodation at each main compound.
- 7.11.39 The forecast size of the construction workforce required at each construction compound per month over the construction programme has been estimated from the construction activities associated with each 'design' element assigned to each compound. The peak and average daily workforce for each compound in the study area are shown in Table 7-163Table 7-79. There are no compounds within the study area with shift working (24 hours).
- 7.11.40 The location of compounds are shown on Maps CT-05-068 to CT-05-074-L1 (Volume 2, Map Book 15).

Table 7-163: Greatworth to Lower Boddington assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Satellite	Greatworth green tunnel	145	232
Main	Chipping Warden green tunnel	172	187
Satellite	Thorpe Mandeville cutting,	32	45

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		Average	Peak
Satellite	Greatworth green tunnel north portal (rail systems)	7	10
Satellite	Lower Thorpe viaduct	109	191
Satellite	Culworth cutting	133	192
Satellite	Danes Moor Auto-transformer site (rail systems)	26	38
Satellite	Chipping Warden tunnel south portal (rail systems)	8	12
Satellite	Chipping Warden tunnel north portal (rail systems)	21	38
Satellite	Claydon Road overbridge	81	144
Satellite	Banbury Road Green overbridge and Boddington auto-transformer station	27	62

Construction trip assumptions

Trip generation

7.11.41 The duration of when there will be busy transport activity at each site is shown in Table 7-164. This represents the periods when the construction traffic flows will be greater than 50% of the peak month flows. Also shown is the estimated number of daily vehicle trips during the peak month; the lower end of the range shows the average number of trips in the busy period and the upper end the average during the peak month.

Table 7-164: Greatworth to Lower Boddington typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Satellite	Greatworth green tunnel	B4525 and A43 from the east, and B4525 and A422 from the west	2017	six years and six months	54 months	140-200	80-120

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
Main	Chipping Warden green tunnel	A361 Byfield Road	2017	Five years	26 months	190-200	890-1,300
Satellite	Thorpe Mandeville cutting,	Banbury Road, Banbury Lane, B4525, and A422	2017	two years	19 months	50-60	<10
Satellite	Greatworth green tunnel north portal (rail systems)	Sulgrave Road, B4525 and A422	2022	one year and six months	Nine months	<10	0
Satellite	Lower Thorpe viaduct	Banbury Lane and either B4525 Banbury Lane and 'A422 or B4525 and A43	2017	two years	Two months	160-180	1,070-1,240
Satellite	Culworth cutting	Welsh Road via A361 Byfield Road	2018	two years	15 months	160-230	20-30
Satellite	Danes Moor Auto-transformer site (rail systems)		2022	one year and six months			
Satellite	Chipping Warden tunnel south portal (rail systems)	Culworth Road via A361 Byfield Road	2022	one year and nine months	Nine months	20-30	10-20
Satellite	Chipping Warden tunnel north portal (rail systems)	Appletree Lane, Welsh Road, A361 Byfield Road	2022	two years	13 months	80-100	10-20
Satellite	Claydon Road overbridge	Claydon Road (aka Hill Road) via Banbury Road, Welsh Road, A361 Byfield Road	2017	two years and nine months	15 months	130-160	10-30
Satellite	Banbury Road Green overbridge and Boddington auto-transformer station	Banbury Road via Welsh Road, A361 Byfield Road, A45 Stefen Road	2022	Five years and nine months	14 months	70-100	20-30

7.11.42 Information on the indicative construction programme and methodology is provided in Figure 7-16, which illustrates how the phasing of activities at different compounds is generally staggered and that construction activities at individual compounds may not occur over the whole duration presented in Figure 7-16. Consequently the peak traffic movements presented will not generally occur at the same time, although in some instances there may be some overlap.

7.11.43 Where a lorry route serves more than one construction compound, the combined vehicle movements have been assessed.

Assignment of trips

7.11.44 The following key assumptions have been made to assign traffic generated by the Proposed Scheme to the road network:

- for construction traffic assignment, vehicle trips have been assigned to the proposed lorry routes linking the construction compounds to the strategic road network. Where the proposed lorry routes divide, providing a choice of routes, the vehicle trip generation has generally been split equally between the route choices available. Professional judgement has been used to deviate from an equal split in direction in a few instances where applying an equal split would mean that vehicles generated by a particular compound would be taking a longer than necessary route to and from the strategic road network. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the compounds;
- for mass-haul traffic assignment, origins and destinations have been assessed for excess excavated material along the route that needs to be transported by road. The vehicle trips generated by the movement of excavated material have been assigned to the shortest route between identified origins and destinations via the proposed lorry routes and motorway network; and
- for workforce traffic assignment, professional judgement has been used to assign the car trips generated by the construction workforce to the road network taking account of the accessibility by road of each construction compound.

7.11.45 Within the study area, mass-haul movements have been assigned to Banbury Road (between Proposed Scheme and Banbury Lane, Thorpe Mandeville), Banbury Lane (between Banbury Road and B4525 Banbury Lane, Thorpe Mandeville), B4525 Banbury Lane (between Banbury Lane, Thorpe Mandeville and A422, Middleton Cheney), A422 (between B4525 Banbury Lane and A361) and A361 (between A422 and the Proposed Scheme).

7.11.46 Within the study area, construction traffic has been assigned to the roads listed in the construction lorry routes section below. Workforce traffic has been assigned to the same roads and additionally Helmdon Road, Appletree Lane, Claydon Road (also known as Boddington Road), Banbury Road (west of Claydon Road) and Claydon Road (north of Banbury Road).

7.11.47 The assessment takes into account construction traffic and transport impacts of works being undertaken in neighbouring areas.

- 7.11.48 From the CFA adjacent to the south, the Newton Purcell to Brackley area (CFA14), the cumulative average construction traffic flows of approximately 290 cars/LGVs per day (two way) and 12 HGVs per day (two way) have been included in the assessment for this area. These flows have been assigned to Radstone Road.
- 7.11.49 An element of the construction traffic associated with activities in the Ladbroke to Southam area (CFA16) has been incorporated within the traffic movements generated by compounds within this area and the movement of excavated materials crossing this area have been incorporated into the assessment.
- 7.11.50 Construction traffic generated by compounds within CFA16 that impact roads within this study area have been included in the neighbouring Ladbroke & Southam area (CFA16) section of the report. This is because the impacts on these roads originate in the Ladbroke & Southam area.

Construction lorry routes

- 7.11.51 Access routes to construction compound with the study area will as far as reasonably practicable be via the strategic highway network and using designated routes as described below and shown on Maps TR-03-060 to TR-03-061 (Volume 5, Map Book 71):
- Greatworth green tunnel satellite compound will be accessed via A43 and B4525 from the east and via the M40, A422 and B4525 from the west;
 - Chipping Warden green tunnel main compound will be accessed via the A361, from the M40 in the west;
 - Thorpe Mandeville cutting satellite compound will be accessed via Banbury Road from the M40, A422 and B4525 from the west;
 - Greatworth green tunnel north portal (rail systems) satellite compound will be accessed via Sulgrave Road from the M40, A422 and B4525 from the west;
 - Lower Thorpe viaduct satellite compound will be accessed via Banbury Lane from the M40, A422 and B4525 from the west;
 - Culworth cutting satellite compound will be accessed via Welsh Road from the A361 and the M40;
 - Danes Moor Auto-transformer site (rail systems) satellite compound will be accessed via Welsh Road from the A361 and the M40;
 - Chipping Warden tunnel south portal (rail systems) satellite compound will be accessed via Culworth Road from the A361 and the M40 in the west;
 - Chipping Warden tunnel north portal (rail systems) satellite compound will be accessed via Appletree Lane, Welsh Road, A361 and the M40;
 - Claydon Road overbridge satellite compound will be accessed via Claydon Road from the M40, A361 and Welsh Road/Banbury Road from the east; and

- Banbury Green overbridge and Boddington auto-transformer station satellite compound will be accessed via Banbury Road from Welsh Road, A361 and the M40 from the west and/or via Banbury Road from Welsh Road, A361, A45 and the M1 from the east.

Traffic management, road closures and diversions

- 7.11.52 Table 7-165 identifies the road in the study area that will experience temporary closure. The approximate length of diversions listed is the 'worst case' scenario based on the maximum distance from one side of the road closure to the other. In reality, a proportion of vehicles diverted will be subject to a diversion distance less than what is reported.

Table 7-165: Greatworth to Lower Boddington temporary road closures and diversions

Name	Location	Location (chainage)	Diversion route	Approximate length of diversions	Programme	Duration
Helmdon Road	Greatworth	102+100	B4525 Welsh Road, and Marston Road (also known as Sulgrave Road) and Marston Road.	3.9km	Aug 2018	Up to one year and six months
Banbury Lane	Thorpe Mandeville	105+360	Banbury Lane, Banbury Road, and Banbury Road (also known as Sulgrave Road).	6.5km	Jan 2018	Up to two years
Wardington Road	Edgcote	108+300	A361 Byfield Road, Culworth Road and Welsh Road	5.3km	Jan 2018	Up to one year, approximately
Culworth Road	Chipping Warden	109+600	A361 Byfield Road and Welsh Road.	2.5km	Apr 2019	N/A
Appletree Lane	Aston le Walls	111+710	Appletree Road, A361 Byfield Road and Welsh Road	6km	March 2018	Up to four years and six months
Claydon (also known as Hill) Road	Lower Boddington	113+800	Claydon Road (also known as Boddington Road) and Banbury Road	7.4km	Oct 2017	Up to one year and six months

- 7.11.53 The temporary diversions will affect 390 vehicles a day (12 hour 2021 base flow) on Helmdon Road, approximately 370 vehicles a day on Banbury Lane, 200 vehicles a day on Wardington Road, approximately 250 vehicles a day on Culworth Road, approximately 200 vehicles a day on Appletree Lane and approximately 170 vehicles a day on Claydon (also known as Hill) Road.

- 7.11.54 The following roads are to be realigned; however construction of the new roads will be carried out 'off-line', meaning that the existing roads will remain open with no diversion of traffic required until the new off-line sections of road are complete. Traffic management and/or very short term closures i.e. overnight, off-peak or weekend, may be required to tie the new off-line sections of road into existing roads immediately before switchover, although these are not considered to have a substantial impact upon motorised users.

- B4525 Welsh Lane;
- Sulgrave Road;
- Banbury Road, Thorpe Mandeville;
- A361 Byfield Road; and
- Banbury Road, Lower Boddington.

7.11.55 The roads in the study area that will experience permanent closure are listed below and reported on in the operational scheme section of this report:

- Claydon Road (also known as Boddington Road); and
- Culworth Road.

PRoW closures and diversions

7.11.56 The PRoW in the study area that will be subject to temporary closure or diversion during construction of the Proposed Scheme are summarised in Table 7-166.

7.11.57 The impact on PRoW along the route of the Proposed Scheme has been minimised as far as reasonably practicable through the design process.

7.11.58 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-068 to CT-05-074-L1 (Volume 2, Map Book 15).

Table 7-166: Greatworth to Lower Boddington temporary footpath, cycleway and bridleway closures and diversions

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
AN22 (public footpath)	Greatworth	099+550	Aug 2018	100m Up to nine months	Construction of Footpath AN22 Accommodation overbridge Temporary diversion during construction of new overbridge.
AN19 (public footpath)	Greatworth	100+450	Aug 2018	200m Up to nine months	Construction of Bridleway AN 37 Accommodation overbridge Temporary diversion along western side of Proposed Scheme and route of Bridleway AN 37 during construction of overbridge at ch 100+450
AN28 (public footpath)	Greatworth	100+650	Feb 2019	200m Up to nine months	Construction of Greatworth South Cutting Remains open during construction of overbridge at Ch.100+450 and temporarily diverted to AN19 during construction of earthworks
AN14 (public bridleway)	Greatworth	101+100	Feb 2018	100m Up to nine	Construction of Bridleway AN 14 accommodation overbridge Temporary diversion during construction of

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
				months	overbridge at Ch 101+100. TBC
AN13 (public footpath)	Greatworth	102+000	Jan 2018	400m Up to nine months	Construction of Greatworth Green Tunnel Temporary diversion to the east of the existing alignment.
Helmdon Road	Greatworth	102+100	Aug 2018	200m Up to one year and six months	Construction of Greatworth Green Tunnel Temporary diversion via footpath AN13 during construction of the overbridge.
AN4 (public footpath)	Greatworth	102+450	Jan 2018	300m Up to one year and six months	Construction of Greatworth Green Tunnel Temporary diversion along line of footpath AN40 on the western side of Proposed Scheme and via B4525 on the eastern side of Proposed Scheme during construction of the green tunnel.
AN40 (public footpath)	Greatworth	102+700	Aug 2018	500m Up to two years	Construction of Greatworth Green Tunnel Temporary diversion along western side of Proposed Scheme and B4525 Welsh Road during construction of green tunnel
B4525 Welsh Road	Greatworth	102+860	Jan 2021	100m Approximately 2-2.5 years	Construction of Greatworth Green Tunnel Temporarily diverted north to the temporary offline road diversion.
AN42 (public footpath)	Greatworth	103+250	Oct 2019	1.4km Approximately 2.5 years	Construction of Greatworth Green Tunnel Temporary diversion along west of construction boundary, AN4 and to the temp B4525 diversion during construction.
AN39 (public footpath)	Greatworth	103+250	Oct 2019	1.7km Approximately 2.5 years	Construction of Greatworth Green Tunnel Temporary diversion along west of construction boundary, AN4 and to the temp B4525 diversion during construction
Sulgrave Road	Greatworth	103+830	Jan 2018	100m Approximately 2.5 years	Construction of Greatworth Green Tunnel Temporary diversion east to the temporary offline road diversion.
Banbury Road	Thorpe Mandeville	104+530	Oct 2017	100m Approximately 12-15 months	Construction of Banbury Road Overbridge Temporary diversion south to the temporary offline road diversion.
Banbury Lane footpath	Thorpe Mandeville	105+400	Jan 2018	600m Up to two years	Construction of Lower Thorpe Viaduct Temporary diversion around trace and satellite compound during construction of Lower Thorpe viaduct abutment.
AG9 (public bridleway)	Thorpe Mandeville	106+700	Jun 2018	50m Up to nine	Construction of Bridleway AG 9 Overbridge Temporary diversion during construction of

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
				months	overbridge at ch 106+700.
AG10 (public bridleway)	Edgcote	107+400	Aug 2018	100m Up to nine months	Construction of Bridleway AG10 Overbridge Temporary diversion during construction of overbridge at ch 107+600.
Wardington Road	Edgcote	108+300	Jan 2018	1.6km Up to two years	Construction of Edcote Viaduct Temporary diversion via AE 5 and AE 6
AE5 (public footpath)	Edgcote	108+700	Jan 2018	200m Up to two years	Construction of Edcote Viaduct Temporary diversion north of trace during construction of Edcote viaduct abutment.
AE12 Jurassic Way	Chipping Warden	110+100	Jul 2019	100m Approximately 3 years	Construction of Chipping Warden Green Tunnel Footpaths AE12, AE20 and AE21 to be consolidated and temporarily diverted during construction of Chipping Warden green tunnel
AE20 Macmillian Way	Chipping Warden	110+100	Jul 2019	100m Approximately 3 years	Construction of Chipping Warden Green Tunnel Footpaths AE12, AE20 and AE21 to be consolidated and temporarily diverted during construction of Chipping Warden green tunnel
AE21 (public footpath)	Chipping Warden	110+100	Jul 2019	100m Approximately 3 years	Construction of Chipping Warden Green Tunnel Footpaths AE12, AE20 and AE21 to be consolidated and temporarily diverted during construction of Chipping Warden green tunnel
A361 Byfield Road	Chipping Warden	110+700	Apr 2018	200m Approximately 3 years	Construction of Chipping Warden Green Tunnel Temporary diversion west to the temporary offline road diversion.
AE17 (public footpath)	Chipping Warden	110+775	Apr 2018	50m Up to one year and six months	Construction of Chipping Warden Green Tunnel Footpaths to be consolidated and locally diverted along A361 Byfield Road during construction of Chipping Warden green tunnel.
Appletree Lane	Aston Le Walls	111+710	Mar 2018	400m Approximately 4 years	Construction of Chipping Warden Green Tunnel Temporary diversion via footpath AA8 during closure of Appletree Lane.
AA8 (public footpath)	Aston Le Walls	111+950	Mar 2018	400m Approximately 4	Construction of Chipping Warden Green Tunnel

PRoW/pedestrian route	Location	Location (chainage)	Programme	Diversion length (Approx.) and duration	Reason for diversion and diversion route
				years	Footpaths to be consolidated and locally diverted during construction of Chipping Warden green tunnel.
AC2 (public footpath)	Lower Boddington	113+575	Nov 2018	500m Approximately Up to one year	Construction of Lower Boddington Cutting Temporary diversion to west of construction boundary and to Claydon Road during construction of the cutting.
Claydon Road (aka Hill Road) and Public footpath AC1	Lower Boddington	113+800	Oct 2017	200m Up to one year and six months	Construction of Claydon Road Overbridge Temporary diversion during construction of Claydon Road overbridge

7.11.59 The following PRoW will also be temporarily diverted, however only by a negligible distance and are therefore not considered to be substantially impacted during construction of the Proposed Scheme:

- AN6 (public footpath);
- AY12 (public footpath);
- BB3 (public footpath)
- AE5 (public footpath); and
- AE16 (public footpath).

7.11.60 The following PRoW are likely to remain open during construction of the Proposed Scheme and are therefore not considered to be impacted:

- AN37 (public bridleway);
- Culworth Road;
- AE28 (public footpath);
- Claydon Road (also known as Boddington Road); and
- Banbury Road.

7.11.61 The PRoW in the study area that will be subject to permanent closure or realignment are listed below and reported on in the operational scheme section of this report:

- AN37 (public bridleway);
- AN28 (public footpath);
- AN13 (public footpath);
- AG10 (public bridleway)
- AE5 (public footpath);

- Culworth Road;
- AC2 (public footpath);
- Banbury Road; and
- Claydon Road (also known as Boddington Road).

Utilities works

- 7.11.62 Utilities works (including diversions) have been assessed in detail only where they are major and where the traffic and transport impacts from the works separately, or in combination with other works, is greater than other construction activities arising within the study area.
- 7.11.63 Information on the required utility works is outline at this stage, although within the study area it is understood that none of the works to be carried out are major items. It has been assumed, however, that some of the works may be up to six months in duration. Where necessary, temporary local traffic management will be required to carry out these works. However, the type and duration of temporary traffic management are not currently known, and therefore the impact upon the highway network cannot be quantified at present. It is assumed that utility works will be coordinated with the Proposed Scheme civil engineering works where practicable to minimise additional traffic and transportation impacts other than those reported within this document. Roads within the study area which will be affected by utility works are:
- A361 Byfield Road; and
 - B4525.

Avoidance and mitigation measures

- 7.11.64 The following measures (as described in Volume 2, Section 2) have been included as part of the engineering design of the Proposed Scheme and will avoid or reduce adverse impacts on transport users:
- transporting construction materials and equipment along haul roads within and adjacent to the route of the Proposed Scheme, where reasonably practicable, to reduce lorry movements on the public highway;
 - the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in reduced diversions of traffic onto alternative routes;
 - provision of temporary alternative routes and/or building structures early to maintain connectivity for PRoW closed during construction to reduce loss of amenity;
 - HGV routeing as far as reasonably practicable, along the strategic road network and using designated routes for access as shown on Maps TR-03-060 and TR-03-061 (Volume 5, Traffic and Transport Map Book);

- excavated material will be reused where reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway; and
- providing on-site accommodation and welfare facilities to reduce daily travel by site workers.

- 7.11.65 The draft CoCP (see Volume 5: Appendix CT-003-000/1) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.
- 7.11.66 Where reasonably practicable, the number of private car trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported through an over-arching framework travel plan⁹ that will require travel plans to be used, along with a range of potential measures, to mitigate the adverse impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practicable this will encourage the use of sustainable modes of transport or vehicle sharing.
- 7.11.67 The reductions in traffic generation arising from the travel plan measures have not been included in the assessment, which will mean that the traffic related impacts during construction may be overstated.
- 7.11.68 The measures in the draft CoCP (Section 14) include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, bridleways, footpaths and other PRoW affected by the Proposed Scheme as necessary.
- 7.11.69 Specific measures will include core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the morning peak hour and depart after the evening peak hour (although the assessment has assumed that some of the work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5).
- 7.11.70 No other mitigation measures during construction of the Proposed Scheme are considered necessary based on the outcome of this assessment.

⁹ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

Greatworth to Lower Boddington (CFA15) construction impacts

Key construction transport issues

- 7.11.71 Construction of the Proposed Scheme in this study area will have temporary traffic and transport impacts as listed below.
- construction vehicle movements to and from the construction compounds;
 - temporary road closures and associated diversions of motorised users;
 - temporary road closures and associated diversions of bus services; and
 - temporary PRoW closures and associated diversions of non-motorised users.
- 7.11.72 The A423 Southam Road north of Banbury and the A422 Hennef Way in Banbury between the A423 Southam Road and the M40, junction 11 have construction impacts, however these are reported on within the Ladbroke & Southam area (CFA16) section of the report, as the impacts originate from this area.
- 7.11.73 No substantial traffic and transport impacts are expected on waterways and canals, rail services, public transport interchanges, parking and loading, taxis or air transport resulting from the construction of the Proposed Scheme in this area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.11.74 Construction of the Proposed Scheme is anticipated to result in changes in daily traffic flows due to works and construction vehicles accessing worksites and also temporary road closures and diversions. The forecast changes to the strategic and local highway network are detailed below.
- 7.11.75 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the strategic road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-167 and Table 7-168 for AM peak and PM peak flows respectively.

Table 7-167: Greatworth to Lower Boddington strategic road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A361 Byfield Road (south of Welsh Road)	NB	186	214	371	88	158	82	74%	1527%
	SB	484	555	691	91	136	82	25%	906%
A361 Byfield Road (north of	NB	186	214	221	11	7	5	3%	99%

Location	Direction	2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Welsh Road)	SB	484	555	616	14	61	5	11%	59%
B4525 Welsh Lane (west of Greatworth)	EB	256	293	365	16	72	4	25%	38%
	WB	261	299	325	12	26	4	9%	48%
B4525 Banbury Lane (south-west of Banbury Lane)	EB	330	378	466	90	88	77	23%	613%
	WB	445	510	587	86	77	77	15%	899%
B4525 Welsh Lane	EB	234	268	272	15	4	4	2%	35%
	WB	217	249	289	12	41	4	16%	47%

Table 7-168: Greatworth to Lower Boddington strategic road network construction traffic flows (vehicles) - PM peak

Location	Direction	2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A361 Byfield Road (south of Welsh Road)	NB	485	560	688	82	129	78	23%	1943%
	SB	217	250	395	82	144	79	58%	2522%
A361 Byfield Road (north of Welsh Road)	NB	485	560	613	6	53	2	10%	44%
	SB	217	250	253	5	2	2	1%	57%
B4525 Welsh Lane (west of Greatworth)	EB	236	272	297	5	25	1	9%	32%
	WB	226	261	317	7	57	1	22%	22%
B4525 Banbury Lane (south-west of Banbury Lane)	EB	394	454	531	82	77	77	17%	1481%
	WB	303	349	436	83	87	77	25%	1333%
B4525 Welsh Lane	EB	220	254	290	6	36	1	14%	29%
	WB	190	219	220	6	1	1	1%	29%

7.11.76 The 2021 future traffic baseline with Proposed Scheme construction traffic flows on the local road network, where traffic flows (all vehicles or HGVs during either AM or PM peak) will change by 10% or more, are shown in Table 7-169 and Table 7-170 for AM peak and PM peak flows respectively.

Table 7-169: Greatworth to Lower Boddington local road network construction traffic flows (vehicles) - AM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Radstone Road	NB	74	74	114	1	40	1	54%	0%
	SB	119	119	159	1	40	1	34%	164%
Helmdon Road	EB	37	42	47	1	5	0	13%	0%
	WB	10	11	11	0	0	0	0%	0%
Banbury Lane (SW of Thorpe Mandeville)	EB	74	85	184	79	99	78	117%	6800%
	WB	184	210	288	79	78	78	37%	13601%
Banbury Road (Thorpe Mandeville)	EB	58	66	94	1	28	0	42%	30%
	WB	162	185	219	1	34	0	18%	60%
Banbury Lane (Thorpe Mandeville)	NB	17	19	141	93	122	93	647%	0%
	SB	22	25	148	93	122	93	485%	0%
Welsh Road (south of Trafford Bridge)	EB	46	53	111	6	58	5	111%	438%
	WB	37	42	49	5	6	5	15%	0%
Welsh Road (north of Trafford Bridge)	NB	33	38	55	5	17	5	46%	4382%
	SB	34	39	110	6	70	5	179%	936%
Welsh Road (north west of Culworth Rd)	NB	33	38	48	0	11	0	29%	0%
	SB	34	39	79	1	40	0	102%	60%
Appletree Lane	NB	7	8	12	0	4	0	50%	0%
	SB	13	14	33	0	19	0	130%	0%
Claydon Road (also known as Hill Road)	NB	7	8	15	2	6	2	75%	824%
	SB	10	11	53	2	42	2	383%	1648%
Banbury Road (east of Claydon Road)	NB	27	31	51	3	20	2	65%	396%
	SB	24	28	57	3	29	2	103%	260%
Claydon Road (also known as Boddington Road)	NB	6	6	21	0	15	0	233%	0%
	SB	9	11	22	0	11	0	101%	0%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Banbury Road (west of Claydon Road)	NB	26	30	30	0	0	0	0%	0%
	SB	24	27	33	0	6	0	23%	0%
Claydon Road (north of Banbury Road)	NB	8	9	9	0	0	0	0%	0%
	SB	7	8	11	1	3	0	35%	0%
Marston Road	NB	38	44	86	1	42	1	95%	105%
	SB	11	13	25	0	11	0	88%	0%
Appletree Road	EB	27	31	35	2	4	0	13%	0%
	WB	112	128	135	2	7	0	6%	3%
Welsh Rd (south east of Aston le Walls)	NB	42	48	83	2	35	2	72%	520%
	SB	24	28	40	3	13	2	45%	258%
Welsh Rd (north west of Aston le Walls)	NB	42	48	79	2	31	2	64%	520%
	SB	24	28	33	3	5	2	20%	250%

Table 7-170: Greatworth to Lower Boddington local road network construction traffic flows (vehicles) - PM peak

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Radstone Road	NB	95	95	131	1	37	0	39%	54%
	SB	61	61	98	0	37	0	60%	0%
Helmdon Road	EB	12	14	14	0	0	0	0%	0%
	WB	27	31	36	0	5	0	17%	0%
Banbury Lane (SW of Thorpe Mandeville)	EB	158	182	259	78	77	77	42%	6684%
	WB	77	89	186	77	97	77	109%	0%
Banbury Road (Thorpe Mandeville)	EB	139	160	190	1	31	0	19%	10%
	WB	68	78	97	0	19	0	25%	0%
Banbury Lane (Thorpe	NB	20	22	81	31	58	31	260%	0%

Location	Direction			2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		2012 Base	2021 Base	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles							
Mandeville)	SB	10	11	69	31	58	31	534%	0%
Welsh Road (south of Trafford Bridge)	EB	42	48	51	3	2	2	4%	145%
	WB	37	43	94	2	51	2	119%	0%
Welsh Road (north of Trafford Bridge)	NB	32	37	94	2	57	2	152%	0%
	SB	35	41	52	2	11	2	28%	290%
Welsh Road (north west of Culworth Rd)	NB	32	37	70	0	32	0	87%	0%
	SB	35	41	50	1	9	0	23%	0%
Appletree Lane	NB	13	15	31	0	16	0	105%	0%
	SB	7	8	10	0	1	0	16%	0%
Claydon Road (also known as Hill Road)	NB	9	10	48	1	38	1	377%	0%
	SB	8	9	14	1	5	1	53%	0%
Banbury Road (east of Claydon Road)	NB	29	34	60	1	27	1	79%	312%
	SB	25	28	45	1	17	1	59%	623%
Claydon Road (also known as Boddington Road)	NB	12	13	23	0	10	0	76%	0%
	SB	7	8	23	0	15	0	188%	0%
Banbury Road (west of Claydon Road)	NB	27	31	37	0	6	0	19%	0%
	SB	23	27	27	0	0	0	0%	0%
Claydon Road (north of Banbury Road)	NB	10	12	14	0	3	0	23%	0%
	SB	8	9	9	0	0	0	0%	0%
Marston Road	NB	11	12	26	0	14	0	111%	0%
	SB	35	40	71	0	31	0	76%	0%
Appletree Road	EB	143	165	173	1	8	0	5%	0%
	WB	31	35	40	1	4	0	12%	13%

Location	Direction	2012 Base	2021 Base	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
				All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
Welsh Rd (south east of Aston le Walls)	NB	29	33	42	1	9	1	29%	140%
	SB	40	46	76	1	30	1	66%	610%
Welsh Rd (north west of Aston le Walls)	NB	29	33	35	1	2	1	6%	140%
	SB	40	46	72	1	26	1	57%	560%

7.11.77 Roads on which there will be an increase in traffic due to temporary road closures and associated diversion of motorised users (although in addition may also have an increase in other traffic generated by the construction of the Proposed Scheme) are:

- B4525 Welsh Lane (between Helmdon Road and Sulgrave Road), Marston Road (also known as Sulgrave Road), Marston Road (between Marston Road also known as Sulgrave Road and Helmdon Road) and Helmdon Road (between Marston Road and Proposed Scheme), for up to one year and six months from August 2018;
- Banbury Lane (between Proposed Scheme and Banbury Road), Banbury Road (between Banbury Lane and Banbury Road also known as Sulgrave Road), Banbury Road also known as Sulgrave Road (between Banbury Road and Culworth and Banbury Lane (between Culworth and Proposed Scheme), for approximately two years from January 2018;
- Welsh Road (between Wardington Road and Culworth Road), Culworth Road (between Welsh Road and A361 Byfield Road) and A361 Byfield Road (between Culworth Road and Wardington Road), for approximately one year from January 2018;
- Welsh Road (between Culworth Road and A361 Byfield Road), A361 Byfield Road (between Welsh Road and Culworth Road) on a permanent basis;
- Appletree Road, A361 Byfield Road (between Appletree Road and Welsh Road) and Welsh Road (between A361 Byfield Road and Appletree Lane) for up to four years and six months from March 2018; and
- Banbury Road (between Claydon Road (also known as Hill Road) and Claydon Road (also known as Boddington Road)) and Claydon Road (also known as Boddington Road) (between Banbury Road and Claydon Road (also known as Hill Road)), for up to one year and six months from October 2017.

7.11.78 Lorry routes which will be used for the movement of excavated material (although in addition may also have an increase in other Proposed Scheme traffic) are:

- Banbury Road (between Proposed Scheme and Banbury Lane);

- Banbury Lane (between Banbury Road and B4525 Banbury Lane);
- B4525 Banbury Lane (between Banbury Lane and A422);
- A422 (between B4525 Banbury Lane and A361); and
- A361 (between A422 and the Proposed Scheme).

7.11.79 The HGVs used for the transportation of construction materials and equipment will use designated lorry routes as described in Section 7.11.51. Workforce traffic has been assigned to the same roads and additionally Helmdon Road, Appletree Lane, Claydon Road (also known as Boddington Road), Banbury Road (west of Claydon Road) and Claydon Road (north of Banbury Road). Some of these roads may also have an increase in other Proposed Scheme traffic.

7.11.80 The implementation of the draft CoCP (see Volume 5: Annex CT-003-000/1) in combination with the framework travel plan and the construction workforce travel plan will, to some degree, mitigate the traffic related impacts during construction of the Proposed Scheme. The reductions in traffic generation arising from these travel plan measures have not been included in the assessment as presented in this section. No other mitigation is proposed.

Junction performance

7.11.81 During construction of the Proposed Scheme, junctions have been subject to assessment in the cases where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 5% or more due to the Proposed Scheme, on any arm of the junction.

7.11.82 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:

- A422 with A361 (M40 j11);
- A422 with B4525 Banbury Lane;
- A361 Banbury Road with Welsh Road;
- A361 with Culworth Road;
- A361 with Appletree Road;
- A361 Badby Road West with B4037 Badby Road;
- A45 Stefen Way with A361 Badby Road West;
- B4525 Banbury Lane/Welsh Lane with Banbury Lane;
- B4525 Welsh Lane with Radstone Road;
- B4525 Welsh Lane with Marston Road; and

- B4525 Welsh Lane with Helmdon Road.

7.11.83 Of the junctions above, A361 Banbury Road with Welsh Road, A361 with Culworth Road, A361 with Appletree Road, B4525 Banbury Lane/Welsh Lane with Banbury Lane, B4525 Welsh Lane with Radstone Road, B4525 Welsh Lane with Marston Road and B4525 Welsh Lane with Helmdon Road are priority junctions. The 2021 traffic flows with Proposed Scheme traffic (in PCU) of these junctions are shown in Table 7-171 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

Table 7-171: Greatworth to Lower Boddington priority junction flows

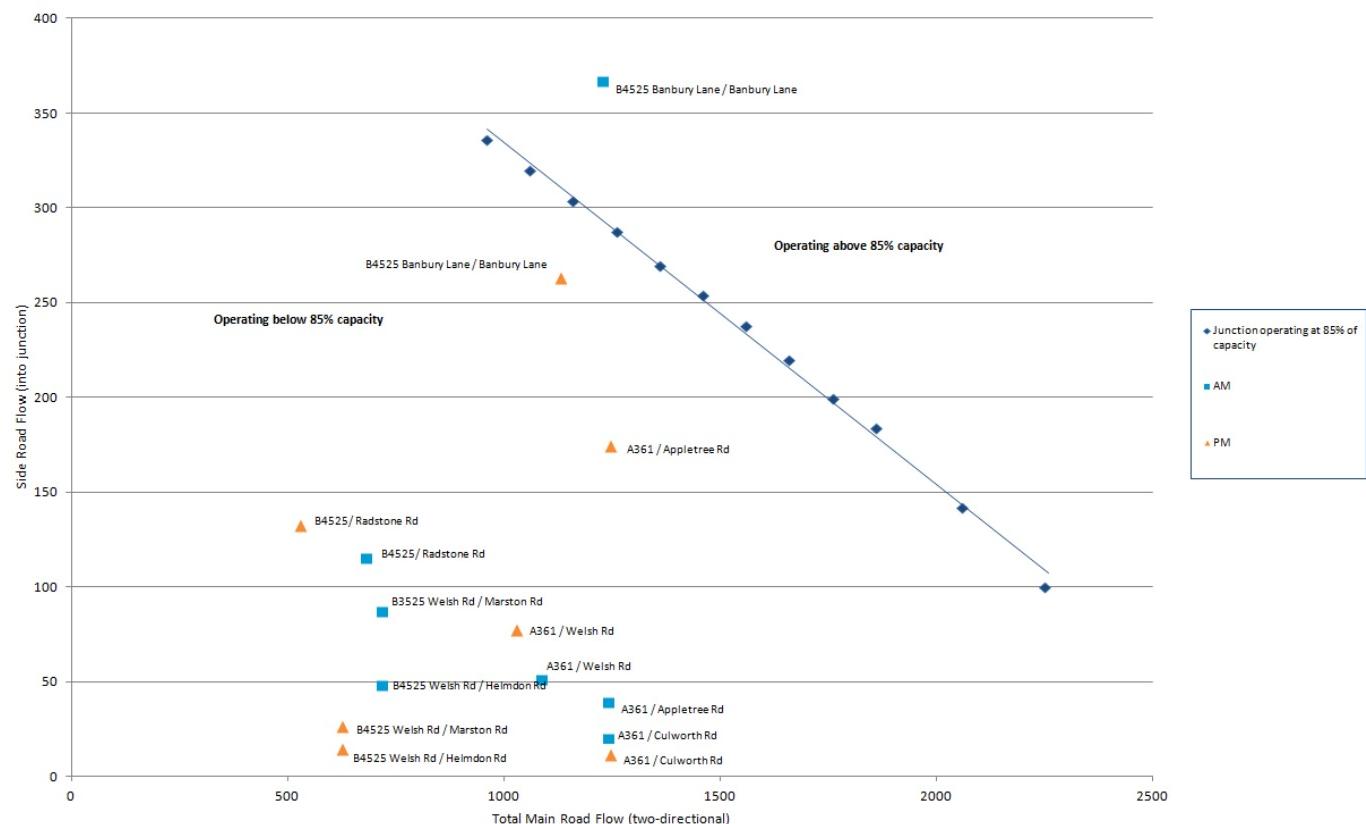
Junction	2021 With HS2 construction traffic			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A361 Banbury Road/Welsh Road	1089	51	1028	77
A361/Culworth Road	1242	20	1247	11
A361/Appletree Road	1242	39	1247	174
B4525 Banbury Lane/Welsh Lane/Banbury Lane	1229	367	1132	263
B4525 Welsh Lane/Radstone Road	682	115	528	132
B4525 Welsh Lane/Marston Road	719	87	626	26
B4525 Welsh Lane/Helmdon Road	719	48	626	14

7.11.84 Traffic flow data on B4037 Badby Road is not available, therefore qualitative assessment has been carried out for the priority junction of A361 Badby Road West with B4037 Badby Road, as outlined later in this section

7.11.85 The priority junctions have been plotted on a graph, shown in Figure 7-17, which shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

7.11.86 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-17: Greatworth to Lower Boddington priority junction assessment 2021



- 7.11.87 The graph illustrates that nearly all priority junctions fall below the 'threshold' of capacity during both AM and PM peaks (apart from the junction of B4525 Banbury Lane/Welsh Lane with Banbury Lane in the AM peak) and are therefore not forecast to be close to their theoretical capacity of 85% during construction of the Proposed Scheme. As a result, they are not considered to warrant individual assessment and have therefore not been assessed with junction assessment software.

7.11.88 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the junction of B4525 Banbury Lane/Welsh Lane with Banbury Lane in the AM peak period during construction of the Proposed Scheme. This may be mitigated through the measures detailed in the draft CoCP, as outlined previously.

- 7.11.89 A qualitative assessment has been carried out for the A422 with A361 (M40 j11), A422 with B4525 Banbury Lane and A45 Stefen Way with A361 Badby Road West non-priority junctions and the A361 Badby Road West with B4037 Badby Road priority junction, as turning count and/or side road baseline traffic data is not available to carry out modelling. The assessment has been based upon forecast peak hour two-way traffic flows (including Proposed Scheme traffic during construction) as it relates to the theoretical capacity of road links. This has been used as a proxy for indicating whether junctions along road links are likely to operate below, close to, or potentially over capacity during construction of the Proposed Scheme.
- 7.11.90 The assessment indicates that increased traffic during the most intensive periods of construction is unlikely to cause additional intermittent traffic congestion and delay at the following junctions during peak periods:
- A422 with A361 (M40 j11);
 - A361 Badby Road West with B4037 Badby Road; and
 - A45 Stefen Way with A361 Badby Road West.
- 7.11.91 The assessment indicates that increased traffic during the most intensive periods of construction may potentially cause additional intermittent traffic congestion and delay at the following junction during peak periods:
- A422 (M40 j11) with A361.

Accidents and safety

- 7.11.92 The proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during construction.

Local bus and coach

- 7.11.93 The temporary closure of Appletree Lane and Helmdon Road will require the diversion of bus services onto alternative routes, as shown in Table 7-172. The approximate additional journey time from start to end of route as a result of diversions has been recorded based upon average speed of service and length of diversion.

Table 7-172: Greatworth to Lower Boddington temporary local bus/coach diversions

Bus/Coach service	Impact	Combined Service Frequency (potential max per hour)	Diversion route	Approximate length of diversions	Approximate additional journey time (start to end of route)
Demand response bus service Route B500	Temporary closure of Appletree Lane, requiring a diversion of the demand responsive bus service, for up to four years and six months	One	Via Appletree Road and A361 Byfield Road	4km	8min
Route 508 bus service	Temporary closure of Helmdon Road, requiring a diversion of the bus service for up to one year and six months	One	Via Marston Road and B4525	1.7km	2.5min

7.11.94 The permanent closure of Culworth Road will require the diversion of the demand responsive Route B500 and Route C500 bus services onto alternative routes. This impact is reported on in the operational scheme section of this report.

7.11.95 Other bus and coach services will not be impacted by construction of the Proposed Scheme except as a result of potential additional traffic congestion and delay at locations identified above.

Pedestrians, cyclists and equestrians

7.11.96 The review of PRoW links indicates there will be additional walking distances on 27 routes due to temporary realignments, with four of these realigned links requiring a diversion of more than 500m.

7.11.97 Table 7-173 summarises the expected impacts to PROWs surveyed within the study area during construction of the Proposed Scheme, with regard to severance and non-motorised user delay due to temporary diversions. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.

7.11.98 Temporary closures and diversions of PRoW during construction are shown on Maps CT-05-068 to CT-05-074-L1 (Volume 2, Map Book 15).

Table 7-173: Greatworth to Lower Boddington summary of PRoW severance (construction)

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
AN22 (public footpath)	Greatworth	099+550	Construction of Footpath AN22 Accommodation overbridge	Temporary diversion during construction of new overbridge.	0	100m	1min
AN19 (public footpath)	Greatworth	100+450	Construction of Bridleway AN 37 Accommodation overbridge	Temporary diversion along western side of HS2 and route of Bridleway AN 37 during construction of overbridge at ch 100+450	0	200m	2min
AN28 (public footpath)	Greatworth	100+650	Construction of Greatworth South Cutting	Remains open during construction of overbridge at Ch.100+450 and temporarily diverted to AN19 during construction of earthworks	0	200m	2min
AN14 (public bridleway)	Greatworth	101+100	Construction of Bridleway AN 14 accommodation overbridge	Temporary diversion during construction of overbridge at Ch 101+100.	1	100m	1min
AN13 (public footpath)	Greatworth	102+000	Construction of Greatworth Green Tunnel	Temporary diversion to the east of the existing alignment.	4	400m	5min
Helmdon Road	Greatworth	102+100	Construction of Greatworth Green Tunnel	Temporarily diverted via footpath AN13 during construction of the overbridge.	2	200m	2 min
AN4 (public footpath)	Greatworth	102+450	Construction of Greatworth Green Tunnel	Temporary diversion along line of footpath AN40 on the western side of Proposed Scheme and via B4525 on the eastern side of Proposed Scheme during construction of	0	300m	4min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
				the green tunnel.			
AN40 (public footpath)	Greatworth	102+700	Construction of Greatworth Green Tunnel	Temporary diversion along western side of Proposed Scheme and B4525 Welsh Road during construction of green tunnel	No data available	500m	6min
B4525 Welsh Road	Greatworth	102+860	Construction of Greatworth Green Tunnel	Temporarily diverted north to the temporary offline road diversion.	3	100m	1min
AN42 (public footpath)	Greatworth	103+250	Construction of Greatworth Green Tunnel	Temporary diversion along west of construction boundary, AN4 and to the temp B4525 diversion during construction.	No data available	1.4km	17min
AN39 (public footpath)	Greatworth	103+250	Construction of Greatworth Green Tunnel	Temporary diversion along west of construction boundary, AN4 and to the temp B4525 diversion during construction	0	1.7km	20min
Sulgrave Road	Greatworth	103+830	Construction of Greatworth Green Tunnel	Temporary diversion east to the temporary offline road diversion.	0	100m	1min
Banbury Road	Thorpe Mandeville	104+530	Construction of Banbury Road Overbridge	Temporary diversion south to the temporary offline road diversion.	No data available	100m	1min
Banbury Lane footpath	Thorpe Mandeville	105+400	Construction of Lower Thorpe Viaduct	Temporary diversion around trace and satellite compound during construction of Lower Thorpe	0	600m	7min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
				viaduct abutment.			
AG9 (public bridleway)	Thorpe Mandeville	106+700	Construction of Bridleway AG 9 Overbridge	Temporary diversion during construction of overbridge at ch 106+700.	4	50m	1min
AG10 (public bridleway)	Edgcote	107+400	Construction of Bridleway AG10 Overbridge	Temporary diversion during construction of overbridge at ch 107+600.	1	100m	1min
Wardington Road	Edgcote	108+300	Construction of Edcote Viaduct	Temporary diversion via AE 5 and AE 6 during closure of Wardington Road.	2	1.6km	19min
AE5 (public footpath)	Edgcote	108+700	Construction of Edcote Viaduct	Temporary diversion north of trace during construction of Edcote viaduct abutment.	17	200m	2min
AE12 Jurassic Way	Chipping Warden	110+100	Construction of Chipping Warden Green Tunnel	Footpaths AE12, AE20 and AE21 to be consolidated and temporarily diverted during construction of Chipping Warden green tunnel	0	100m	1min
AE20 Macmillian Way	Chipping Warden	110+100	Construction of Chipping Warden Green Tunnel	Footpaths AE12, AE20 and AE21 to be consolidated and temporarily diverted during construction of Chipping Warden green tunnel	1	100m	1min
AE21 (public footpath)	Chipping Warden	110+100	Construction of Chipping Warden Green Tunnel	Footpaths AE12, AE20 and AE21 to be consolidated and temporarily diverted during construction of Chipping Warden green tunnel	1	100m	1min
A361 Byfield Road	Chipping Warden	110+700	Construction of Chipping Warden Green	Temporary diversion west to the temporary offline road	0	200m	2min

PRoW	Location	Location (chainage)	Construction Activity	Temporary Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
			Tunnel	diversion.			
AE17 (public footpath)	Chipping Warden	110+775	Construction of Chipping Warden Green Tunnel	Footpaths to be consolidated and locally diverted along A361 Byfield Road during construction of Chipping Warden green tunnel.	7	50m	1min
Appletree Lane	Aston Le Walls	111+710	Construction of Chipping Warden Green Tunnel	Temporary diversion via footpath AA8 during closure of Appletree Lane.	23	400m	5min
AA8 (public footpath)	Aston Le Walls	111+950	Construction of Chipping Warden Green Tunnel	Footpaths to be consolidated and locally diverted during construction of Chipping Warden green tunnel.	0	400m	5min
AC2 (public footpath)	Lower Boddington	113+575	Construction of Lower Boddington Cutting	Temporary diversion to west of construction boundary and to Claydon Road during construction of the cutting.	2	500m	6min
Claydon Road (aka Hill Road) and Public footpath AC1	Lower Boddington	113+800	Construction of Claydon Road Overbridge	Temporary diversion during construction of Claydon Road overbridge	141	200m	2min

Greatworth to Lower Boddington (CFA15) Proposed Scheme operation description

Operation trip assumptions

- 7.11.99 The permanent closure of Culworth Road will result in a change in traffic demand on the A361 Byfield Road, between Culworth Road and Welsh Road, and Welsh Road, between Culworth Road and A361 Byfield Road, which is the permanent diversion route for motorised users. The forecast changes in demand on these roads for 2026 and 2041 has been assessed and is detailed in the following section.

- 7.11.100 It is forecast that there will be no further substantial changes in demand on existing transport infrastructure within the study area due to the Proposed Scheme in 2026 and 2041.

Traffic management, road closures and diversions

- 7.11.101 Table 7-174 identifies the roads in the study area that will experience permanent closure.
- 7.11.102 Culworth Road and Claydon Road (also known as Boddington Road) will remain open during operation of the Proposed Scheme for local access to existing properties and Proposed Scheme infrastructure only.

Table 7-174: Greatworth to Lower Boddington permanent road closures and diversions

Name	Location	Diversion route	Approximate length of diversions
Culworth Road	Chipping Warden	Via A361 Byfield Road and Welsh Road	5km
Claydon Road (also known as Boddington Road)	Lower Boddington	Via Banbury Road	1.5km

- 7.11.103 The permanent diversions will affect approximately 280 vehicles a day (12 hour 2026 base flow) on Culworth Road and 230 vehicles a day on Claydon Road (also known as Boddington Road). There will be an adverse impact upon motorised users who will be subject to an increased travel distance as a result of the permanent diversion.
- 7.11.104 There will be no change to forecast traffic flows on existing links as a result of the permanent diversion to Claydon Road (also known as Boddington Road).
- 7.11.105 Changes to forecast traffic flows on existing links as a result of the permanent diversion to Culworth Road are discussed below.

Avoidance and mitigation measures

- 7.11.106 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in their current location, or very close to their current location resulting in no substantial diversions of traffic onto alternative routes; and
 - retaining PRoW crossing the Proposed Scheme, with any localised realignments or diversions reduced to a reasonably practicable minimum length.
- 7.11.107 There will be no further measures to mitigate traffic and transportation impacts during operation of the Proposed Scheme.

Greatworth to Lower Boddington (CFA15) operation impacts

- 7.11.108 This section provides an overview of the operational traffic and transport impacts due to the Proposed Scheme in the study area for year 2026 and year 2041.
- 7.11.109 The impacts of the operation of the Proposed Scheme in 2041 will be very similar to 2026, having taken account of increased background traffic growth.
- 7.11.110 The permanent closure of Culworth Road at Calvert will generate traffic on the A361 Byfield Road and Welsh Road during operation of the Proposed Scheme and has been accounted for in the assessment years of 2026 and 2041.

Key operation transport issues

- 7.11.111 Operation of the Proposed Scheme in this study area will have permanent traffic and transport impacts as listed below.
- permanent road closures or realignments and associated diversions to motorised users;
 - permanent road closures and associated diversions of bus services; and
 - permanent realignment or closure of PRoW and associated diversions to non-motorised users.
- 7.11.112 No substantial traffic and transport impacts are expected on waterways and canals, rail services, public transport interchanges, parking and loading, taxis or air transport resulting from the operation of the Proposed Scheme within this study area. Therefore, these traffic and transport impacts are not discussed further for this study area.

Strategic and local road network traffic flows

- 7.11.113 The forecasting methodology and highway network assessment include for cumulative impacts of planned development during operation, by taking into account background traffic growth.
- 7.11.114 There will be no additional traffic resulting from the operation of the Proposed Scheme in neighbouring areas.
- 7.11.115 Within the study area the impact of the permanent closure of Culworth Road, which will result in a change in traffic flows on the A361 Byfield Road and Welsh Road, has been accounted for during the 2026 and 2041 operational years of assessment accordingly.
- 7.11.116 Occasional traffic may access areas of the Proposed Scheme for maintenance purposes. However, these infrequent vehicle movements are anticipated to be very low and will therefore not have a substantial impact. As a result, 2026 and 2041 traffic flows for all roads within the study area, apart from those affected by the permanent closure of Culworth Road as discussed below, are expected to remain the same as the 2026 and 2041 future baseline traffic flows.

- 7.11.117 Traffic flow changes assigned to the local road network within the study area, where considered to be impacted by the permanent closure of Culworth Road, are presented in Table 7-175 and Table 7-176 for AM peak and PM peak flows for 2026 year of operation, respectively.

Table 7-175: Greatworth to Lower Boddington strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – AM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A361 Byfield Road (between Welsh Road and Culworth Road) (Chipping Warden)	NB	230	239	6	+9	0	4%	2%
	SB	597	619	10	+22	0	4%	5%
Culworth Road (Chipping Warden)	NB	9	0	0	-9	0	-100%	-100%
	SB	22	0	0	-22	0	-100%	-100%
Welsh Road (between Culworth Road and A361 Byfield Road) (Chipping Warden)	NB	40	62	1	+22	0	54%	400%
	SB	42	52	1	+9	0	22%	20%

Table 7-176: Greatworth to Lower Boddington strategic and local road network 2026 future baseline With HS2 traffic (vehicles) – PM peak

Location	Direction	2026 baseline flow	2026 With HS2 traffic		With HS2 actual change from 2026 baseline		With HS2 % change from 2026 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A361 Byfield Road (between Welsh Road and Culworth Road) (Chipping Warden)	NB	605	625	4	+20	0	3%	0%
	SB	271	283	4	+12	0	4%	7%
Culworth Road (Chipping Warden)	NB	20	0	0	-20	0	-100%	0%
	SB	12	0	0	-12	0	-100%	-100%
Welsh Road (between Culworth Road and A361 Byfield Road) (Chipping Warden)	NB	40	53	0	+12	0	30%	0%
	SB	44	64	1	+20	0	45%	0%

- 7.11.118 As a result of the permanent closure of Culworth Road and associated diversion, traffic flows will increase by up to 54% (up to 22 additional vehicles) on Welsh Road, between Culworth Road and A361 Byfield Road, during peak hour periods. However, baseline flows are low, at up to 44 vehicles an hour, and well under the theoretical capacity of the link. Therefore the increase in traffic during peak periods is unlikely to give rise to substantial impacts upon motorised or non-motorised users.
- 7.11.119 Traffic flows will increase by up to 4% (up to 20 additional vehicles) on A361 Byfield Road, between Welsh Road and Culworth Road, during peak hour periods. This level of additional traffic is unlikely to cause substantial impacts upon motorised or non-motorised users and baseline flows suggest the link has spare capacity to accommodate the diverted traffic.
- 7.11.120 Traffic flow changes assigned to the local road network within the study area, where considered to be impacted by the permanent closure of Culworth Road, are presented in Table 7-177 and Table 7-178 for AM peak and PM peak flows for 2041 year of operation, respectively.

Table 7-177: Greatworth to Lower Boddington strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – AM peak

Location	Direction	2046 baseline flow	2046 With HS2 traffic		With HS2 actual change from 2046 baseline		With HS2 % change from 2046 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A361 Byfield Road (south of Welsh Road) (Chipping Warden)	NB	272	283	7	+11	0	4%	2%
	SB	705	731	12	+26	+1	4%	5%
Culworth Road (Chipping Warden)	NB	11	0	0	-11	0	-100%	-100%
	SB	26	0	0	-26	-1	-100%	-100%
Welsh Road (north west of Culworth Road) (Chipping Warden)	NB	49	75	1	+26	+1	54%	400%
	SB	51	62	1	+11	0	22%	20%

Table 7-178: Greatworth to Lower Boddington strategic and local road network 2041 future baseline With HS2 traffic (vehicles) – PM peak

Location	Direction	2046 baseline flow	2046 With HS2 traffic		With HS2 actual change from 2046 baseline		With HS2 % change from 2046 baseline	
		All vehicles	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
A361 Byfield Road (south of Welsh Road) (Chipping Warden)	NB	726	750	5	+24	0	3%	0%
	SB	324	339	4	+15	0	5%	8%
Culworth Road (Chipping Warden)	NB	24	0	0	-24	0	-100%	0%
	SB	15	0	0	-15	0	-100%	-100%
Welsh Road (north west of Culworth Road) (Chipping Warden)	NB	49	64	0	+15	0	30%	0%
	SB	54	78	1	+24	0	45%	0%

7.11.121 The change in traffic flows, as a percentage, on roads affected by the permanent closure of Culworth Road are the same, or very similar, during the 2041 year of assessment as the 2026 year of assessment. The impacts upon motorised and non-motorised users for 2041 year of assessment will therefore remain the same as reported for 2026.

Junction performance

7.11.122 During operation of the Proposed Scheme, junctions have been subject to assessment where peak hour two-way traffic flow (including Proposed Scheme traffic) is 500 vehicles or more and where there is a change in peak hour two-way traffic flow of 2% or more due to the Proposed Scheme, on any arm of the junction. For operation of the Proposed Scheme, the assessment has been carried out for assessment year 2041, as it represents the worst case scenario whereby the baseline flows are higher than in assessment year 2026, and is therefore more robust.

7.11.123 The junctions within the study area which meet the junction assessment criteria above and therefore considered to be impacted by the Proposed Scheme are:

- A361 with Welsh Road.

7.11.124 The 2021 traffic flows with Proposed Scheme traffic (in PCU) at the A361 with Welsh Road priority junction are shown in Table 7-179 for both the AM and PM peak. Traffic flows presented are two-way on the main road and one way on the side road approaching the junction.

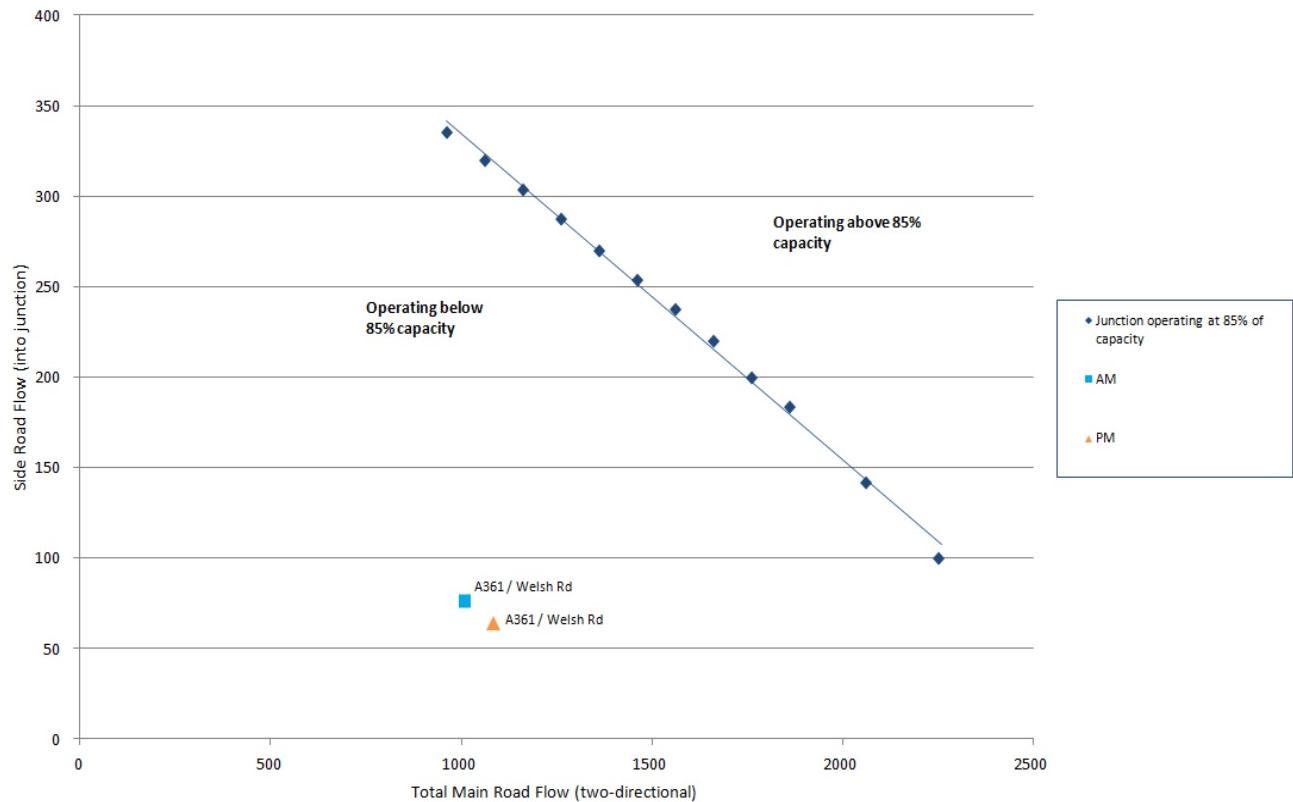
Table 7-179: Waddesdon and Quainton Culworth Road closure priority junction flows 2041

Junction	2041 Operation			
	AM peak		PM peak	
	Main road flow (PCU)	Side road flow (PCU)	Main road flow (PCU)	Side road flow (PCU)
A361/Welsh Rd	1007	76	1084	64

7.11.125 The junction has been plotted on a graph, shown in Figure 7-18, that shows the theoretical capacity of a simple priority junction based on the relative main road and side road traffic flows.

7.11.126 A 'best fit' trend line has been added to the graph to highlight the theoretical 85% threshold of capacity in terms of the ratio of demand to capacity. The 85% ratio is generally considered to be the threshold above which a junction is approaching its practical traffic capacity. Above this level day to day variations in traffic flow may lead to intermittent traffic congestion and delay. A flow to capacity ratio in excess of 100% indicates the priority junction is operating beyond its theoretical capacity and as a result, traffic congestion and delay is likely.

Figure 7-18: Waddesdon and Quainton Culworth Road closure junction assessment 2041



- 7.11.127 The graph illustrates that the A361 with Welsh Road junction falls well below the 'threshold' of capacity and is therefore not predicted to be close to their theoretical capacity of 85% during operation of the Proposed Scheme. As a result, it is not considered to warrant individual assessment and has therefore not been assessed with junction assessment software.

Accidents and safety

- 7.11.128 The Proposed Scheme will have no substantial impact on accident and safety risk as there are no locations where there are both accident clusters and substantial increases in traffic during operation.

Local bus and coach

- 7.11.129 Culworth Road is used on an ad hoc basis by the demand responsive bus services in Northamptonshire, which operate according to bookings made on a dedicated online booking system. The bus services operate on an hourly basis between 08:30 and 17:00 with no fixed route, and can be booked a day in advance between 09:30 and 12:30.

- 7.11.130 Typically, a diversion of 2.5km will be required as buses continue on Welsh Road and access Chipping Warden via the A361 Byfield Road. Access to a small residential development at the eastern end of Culworth Road will be maintained off Welsh Road, meaning the demand responsive service could potentially deviate off Welsh Road to accommodate passengers boarding/alighting at the residential development. In this instance, the diversion would be approximately 3.5km, which accounts for the bus service doubling back onto Welsh Road and continuing onto A361 Byfield Road into Chipping Warden.
- 7.11.131 Table 7-180 summarises the additional travel distance and time expected to result from the diverted bus services. The approximate additional journey time from start to end of route as a result of diversions has been recorded based upon average speed of service and length of diversion.

Table 7-180: Greatworth to Lower Boddington permanent local bus/coach diversions

Bus/Coach service	Impact	Combined Service Frequency (potential max per hour)	Diversion route	Approximate length of diversions	Approximate additional journey time (start to end of route)
Demand responsive B500 and C500 services	Closure of Culworth Road, requiring a diversion of the bus service	One	Via A361 Byfield Road	Up to 3.5km	5min

Pedestrians, cyclists and equestrians

- 7.11.132 PRoW will be reinstated following construction of the Proposed Scheme where practicable. Therefore the impact on non-motorised users from the permanent realignment of PRoW during operation of the Proposed Scheme will be less than that during construction.
- 7.11.133 The review of PRoW links indicates that there will be additional walking distances on nine routes due to permanent realignments, with one of these realigned links requiring a diversion of more than 500m.
- 7.11.134 Table 7-181 presents the expected impacts to PROW surveyed within the study area in 2026 and 2041, in regards to severance and non-motorised user delay, which are set out as diversion length and journey time. In presenting the delay experienced by users, a walking speed of 1.4 metres/second has been assumed.
- 7.11.135 Permanent closures and diversions of PRoW during operation are shown on Maps CT-06-068 to CT-06-074-L1 (Volume 2, Map Book 15).

Table 7-181: Greatworth to Lower Boddington summary of PRoW severance (operation)

PRoW	Location	Location (chainage)	Permanent Diversion Route	Daily Users	Maximum Diversion Length	Maximum Diversion Journey Time (nearest minute)
AN37 (public bridleway)	Greatworth	100+100	Permanent diversion via new a new Bridleway AX37 overbridge	2	250m	3min
AN28 (public footpath)	Greatworth	100+650	Permanent diversion via overbridge and Bridleway AX37.	0	400m	5min
AN13 (public footpath)	Greatworth	102+000	Permanent diversion via Helmdon Road.	4	200m	2min
AG10 (public bridleway)	Edgcote	107+400	Permanent diversion via Bridleway AG10 accommodation overbridge.	1	50m	1min
AE5 (public footpath)	Edgcote	108+700	Permanent diversion under Edgcote viaduct.	17	200m	2min
Culworth Road	Chipping Warden	109+600	Permanent diversion via offline public bridleway.	17	400m	5min
AC2 (public footpath)	Lower Boddington	113+575	Permanent diversion via access track to Claydon Road overbridge.	2	500m	6min
Claydon Road (also known as Boddington Road)	Boddington	115+380	Permanent diversion via realigned Claydon Road and Banbury Road overbridge.	0	1.6km	19min
Banbury Road	Boddington	115+150 to 115+400	Permanent diversion via realigned Banbury Road and Claydon Road overbridge.	no data available	200m	2min

- 7.11.136 All other PRoW will be reinstated with negligible deviation from their existing alignment and are therefore non-motorised users are not considered to be substantially impacted during operation of the Proposed Scheme.

